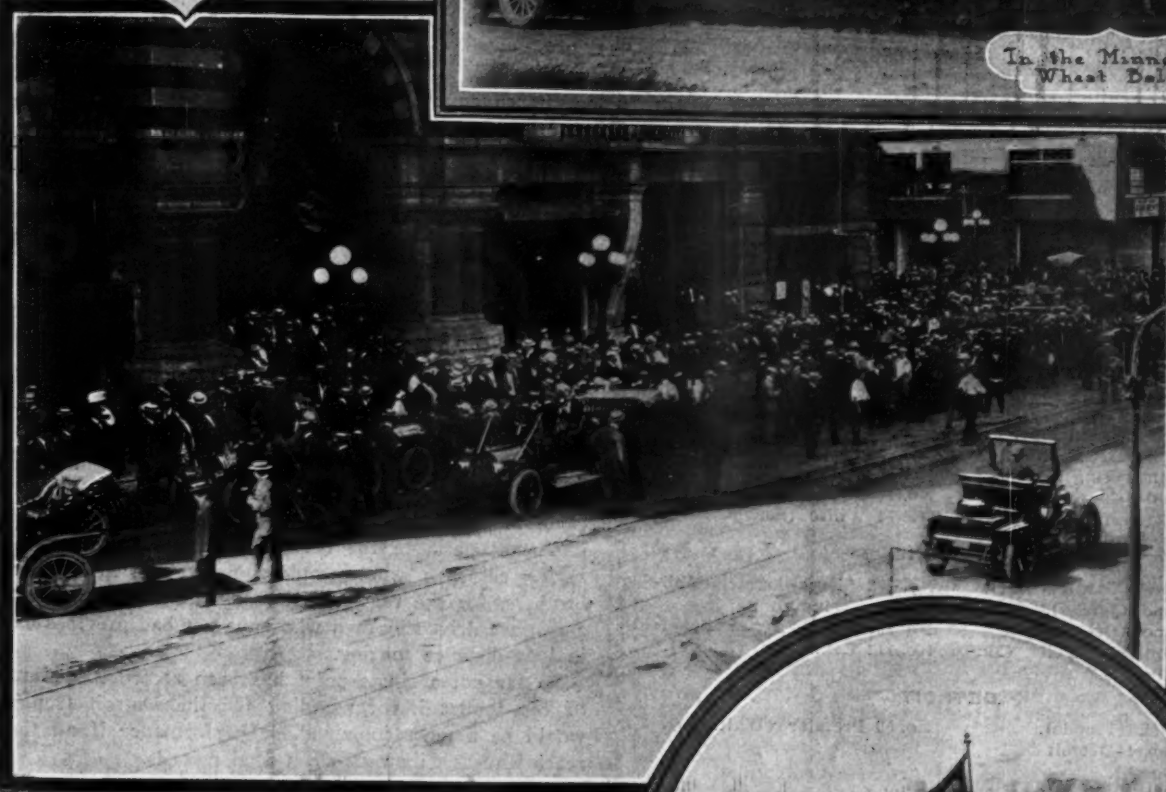


# THE AUTOMOBILE

## BIG TOUR COVERS THE GOLDEN NORTHWEST



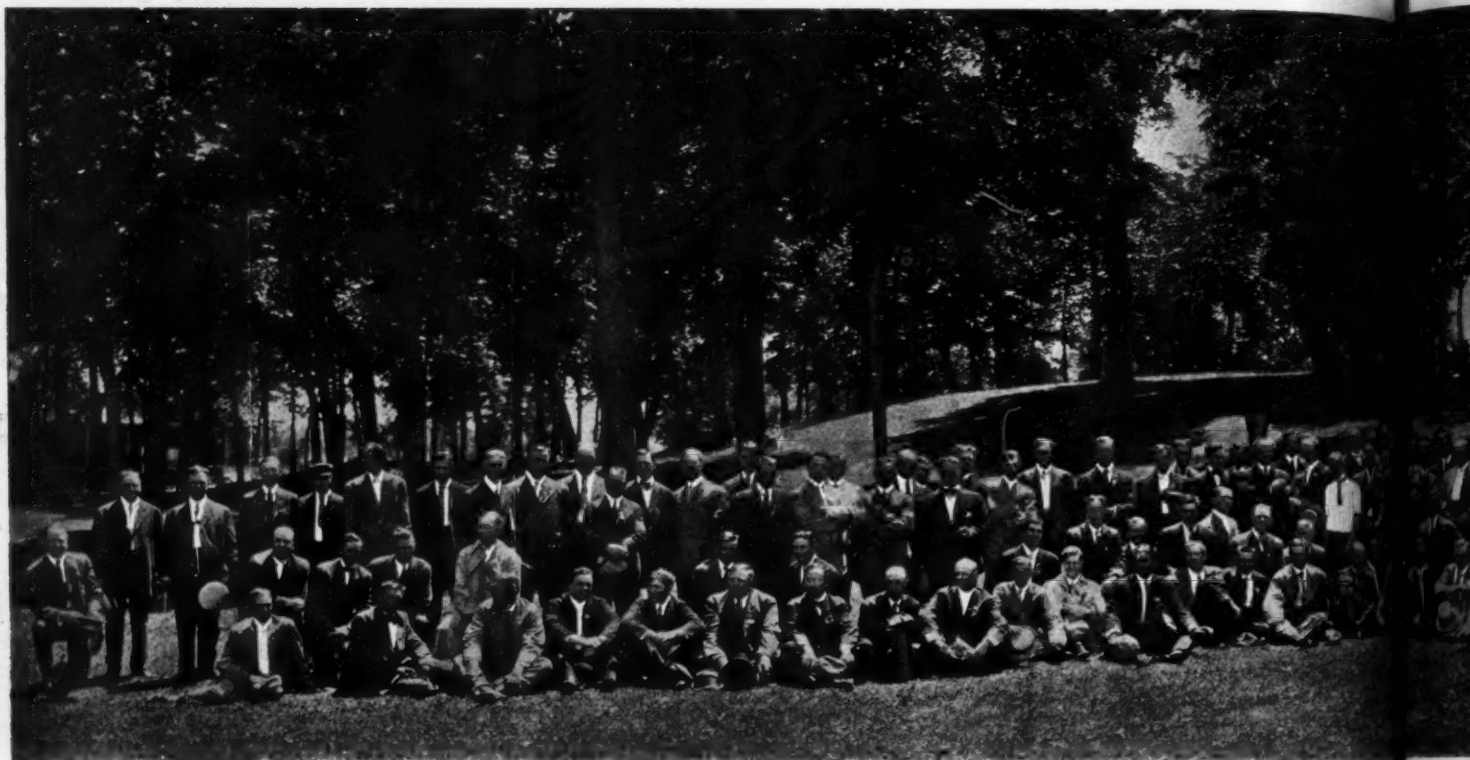
Arrival at Hotel West, Minneapolis



Lake Minnetonka's Waters Provided a Pleasing Diversion

MINNEAPOLIS, MINN., July 19—Next comes the second leg of the reliability tour. At exactly eight o'clock the first of the contestants headed southeasterly for Mankato, some 132 miles distant over roads that would quickly deteriorate if much rain fell. Confidently and refreshed with the hospitable two-day stay in this bustling city of the great Northwest the dust-saturated and discolored contenders began the obliteration of the 1,813 remaining miles, happy in the knowledge that 823 of the 2,636 total had been left behind.

'Twas with few losses that the fight was renewed, only two of the thirty having fallen by the wayside since the start from



All the Participants in the Glidden Tour Were Most Hospitably Entertained at the Tonka Bay, July 18

Detroit just one week ago. These crippled ones never expected to be real prize winners, being hopelessly outclassed in horsepower and price. Answering admirably the purposes intended for them, they were at an impossible disadvantage in such a strenuous tour as this sixth annual of the American Automobile Association.

One week's driving found these cars still up and doing and without any demerits:

#### GLIDDEN

- |                           |                                  |
|---------------------------|----------------------------------|
| No. 1 Premier (Jay).      | No. 8 Pierce-Arrow (Dey).        |
| No. 2 Premier (Hammond).  | No. 9 Pierce-Arrow (Winchester). |
| No. 4 Marmon (H. Marmon). | No. 10 Glide (Bartholomew).      |
| No. 5 Marmon (Wing).      | No. 11 Thomas (Buse).            |
| No. 6 Maxwell (Gager).    | No. 14 White (Searles).          |
| No. 7 Jewell (Bernhart).  |                                  |

#### HOWER

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| No. 100 Moline (VanDervoort).       | No. 108 Pierce-Arrow (Williams). |
| No. 101 Moline (Wicke).             | No. 109 Pierce-Arrow (Schofeld). |
| No. 102 Moline (Gregory).           | No. 114 Lexington (Moore).       |
| No. 105 Chalmers-Detroit (Machsky). |                                  |

#### DETROIT

- |                                 |                           |
|---------------------------------|---------------------------|
| No. 51 Simplex (Woods).         | No. 53 Premier (Waltman). |
| No. 52 Chalmers-Detroit (Bemb). |                           |

By an exact count five of the 15 running days are over. The daily runs have been covered at an average pace of 30 miles per hour for the class A cars and from that down to 18 miles per hour for the class E cars, which are vehicles selling for less than \$999.

Although the tour is one-third over it is not expected that one-third of the total penalties that will be recorded on arrival at Kansas City have been chalked up against the cars. As in previous years, the last few days will be trying ones on many cars. So far the cars have all made a most creditable performance; in fact, much better than was expected when they departed from Detroit.

Of the thirty cars that started on the Glidden-Hower-Detroit tour only nine—scarcely one-third—have suffered penalties in one-third of the test. But two have had troubles among the thirteen Glidden cars, and these have been due to two broken

fender irons and a mud apron which struck a waterbreaker, was pressed against the flywheel, and had to be hammered back into place. Not one of these incidents or happenings had any effect on the running of the car, in that the motor and the transmission system were not in any way injured. This is a remarkable performance over roads that have been treacherous in many ways, due to hidden rocks buried in the sand and dust, to bad bridge or culvert approaches, to waterbreakers, and to miles upon miles of long sandy stretches.

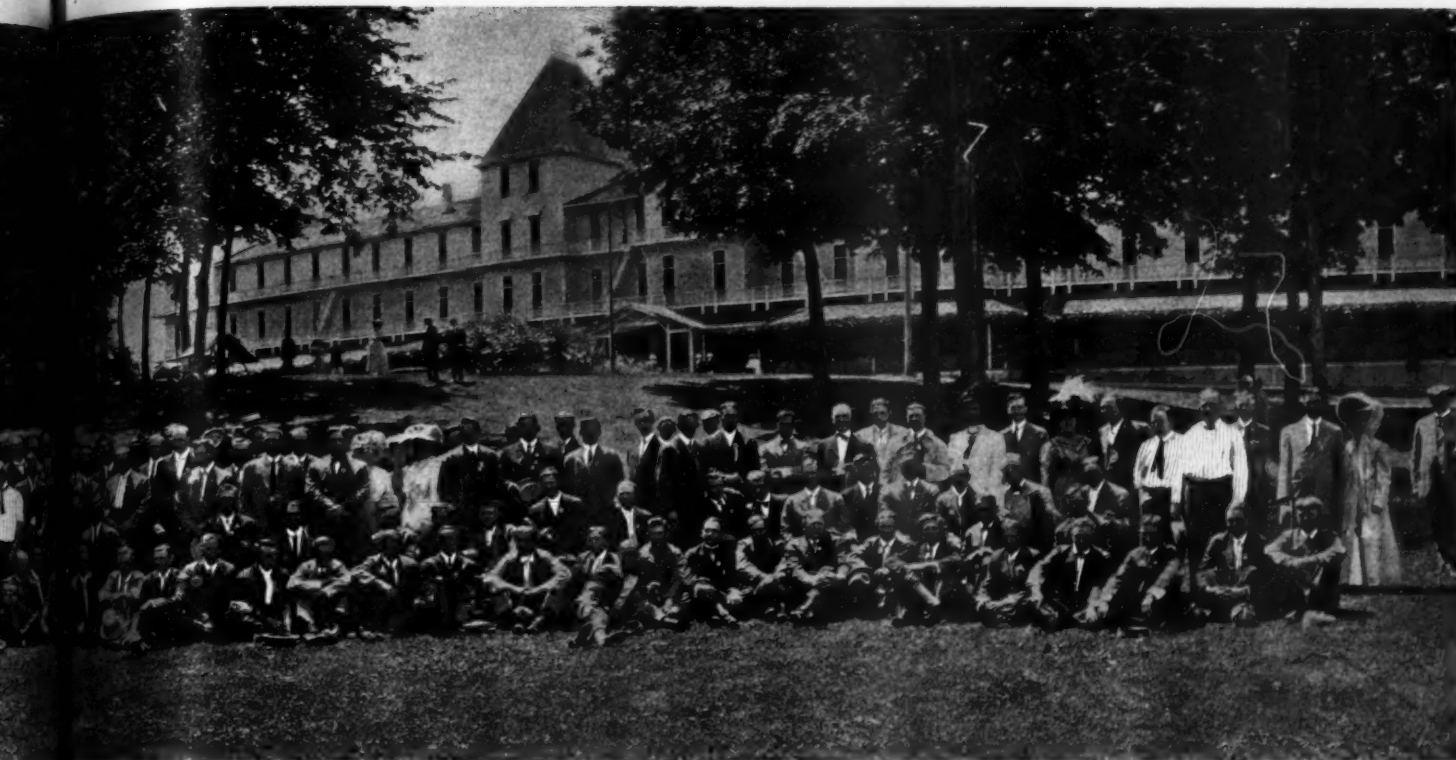
The Hower runabout contestants are not faring so well, for of the fourteen that started seven have already received penalties. Fifty per cent. penalized in the first third of the tour is too much even if the runabouts have had to travel on a fast schedule as compared with many of the Glidden entrants. With the Hower candidates the penalties have been more directly connected with important parts of the cars. It was never expected that the Hower cars as a whole would show up so well as their Glidden brothers, for the reason that many are lower-powered and not a few are driven by men who have not had previous experiences in long-distance touring.

So far not a single point has been recorded against the trio of toy tonneauts contending for the Detroit trophy, and it would be a most commendable performance if all three could reach Kansas City with clean road records.

#### Notable Lack of Serious Mechanical Trouble

A great contrast of the mechanical troubles thus far as compared with previous tours is the entire freedom from spring troubles. There has not yet been recorded a single case of breaking spring leaves. In previous Gliddens in the first few days many cars suffered; but it appears that experience has had a valuable effect on this part of the car, and the makers have seen to it that springs are made adequately strong. Last year had several examples of broken wheels. Wheels are heavier this season. In the majority of cars the I-beam front axle is used and not a single one yet shows any weakness as a result of experiences with waterbreakers. In fact, in looking over the cars each morning as they check out, it is remarkable how spick and span they all appear. The fenders are in place, the bodies not dented, wheels are running true, no odor of burning brakes has





July 18, After a Two-Hour Boat Ride on the Crystal Waters of Beautiful Lake Minnetonka.

been discovered, and many of the high-priced machines have not taken a drop of water since leaving Detroit. It is remarkable how little work is done on the cars.

It is proper to give great credit to improvements in the cars, but the drivers must not be overlooked. Old veterans such as "Teddy" Dey, Frank Wing, Walter Winchester, Webb Jay, H. Hammond, "Jack" Williams, and Gus Buse, Jr., are taking no chances, because each one sees a possibility of winning the Glid-

den trophy himself. Last year it was won by a team of three men with three cars, but this year it will be won by one driver and his car. This new phase of the rules gives additional interest, and each driver realizes that it entirely depends upon himself whether he wins or loses and that he cannot be prevented from winning by a team-mate who may have been running in hard luck. This is a big factor in the maintenance of the big clean score sheet.

## HOW MINNEAPOLIS EXTENDED A REAL WELCOME

**M**INNEAPOLIS, MINN., July 19—This half of the "Twin Cities" is fulfilling the promises made to give the Gliddenites one of the finest entertainments on record. Never before this year have the travelers been so feasted and fêted, and with four points en route where special programmes have been arranged, each is striving to outdo the others. Elaborate preparations had been made at the Minneapolis Automobile Club for the two full days spent here, and there has not been a dull moment. From the time the cars appeared at the city limits there were interesting doings.

Dinners, trolley rides, military reviews, boat rides and an automobile parade were features, all of which were enjoyed and appreciated. The mammoth parade held Saturday evening in the center of the city took the top notch for beauty and excellent management. When it was stated by those who have seen similar celebrations in other parts of the country that the one here was the finest, the comparison was not overdrawn, and the tourists will take away with them an excellent impression of the enterprise of the autoists of Minneapolis.

There were 358 cars in line, of which forty were elaborately decorated, and all of the participants flew American, Minneapolis and welcoming flags. The lights of the long line, moving at a rate of about 12 miles per hour, made the down-town streets as light as day, when combined with the brilliant decorations on the buildings and the red flares. Such ingenuity as was displayed in the finishings of the automobiles has probably never been equaled, for all of the handsomest ones were illuminated, and the

settings were particularly fine. The first prize, a wicker touring outfit, was won by Miss H. B. Whitted, whose Wilcox car, made in Minneapolis, was arranged with a canopy of fresh cut flowers, intertwined with electric lights. The second prize, a pair of Solar lamps, was won by C. E. Van Duzee, who had his Chalmers-Detroit entirely covered with tufted white material, only the tires showing, with all the occupants dressed in white. For the best decorated car driven by a woman, a cut-glass punch bowl and glasses were presented to Miss Ethel Cosgrove, who had a Maxwell handsomely trimmed with white flowers. The pleasing decoration included a large swan and two storks with all occupants of the car utilizing the numerous electric light bulbs which made the craft so markedly artistic. From the rear projected the stern of a canoe in which sat another young woman dressed in white and holding a paddle studded with small electric lights. A wonderfully beautiful effect was made by the American roadster which competed in the division for cars decorated by the children of the owner. Long and racy, it lent itself readily to the scheme, and was entirely covered with dainty white with purple trimmings, and with purple lights along the sides and rear. In front, on the radiator, was an immense letter "G" in lights, in honor of the Glidden tour. It was driven by John Fawkes, the son of L. H. Fawkes, and the prize was a camera.

To show that trucks can be made veritable fairy-lands was illustrated several times during the evening. The best appearing one was beautiful, indeed, a gorgeous affair, in the center of which a miniature fountain surrounded by greens spouted real



Rose-Decked Wilcox Car, a Leading Prize Winner

water from a little conservatory. This won first prize, a Bowser oil outfit, for the L. S. Donaldson Company, and its driver secured an order for a suit of clothes.

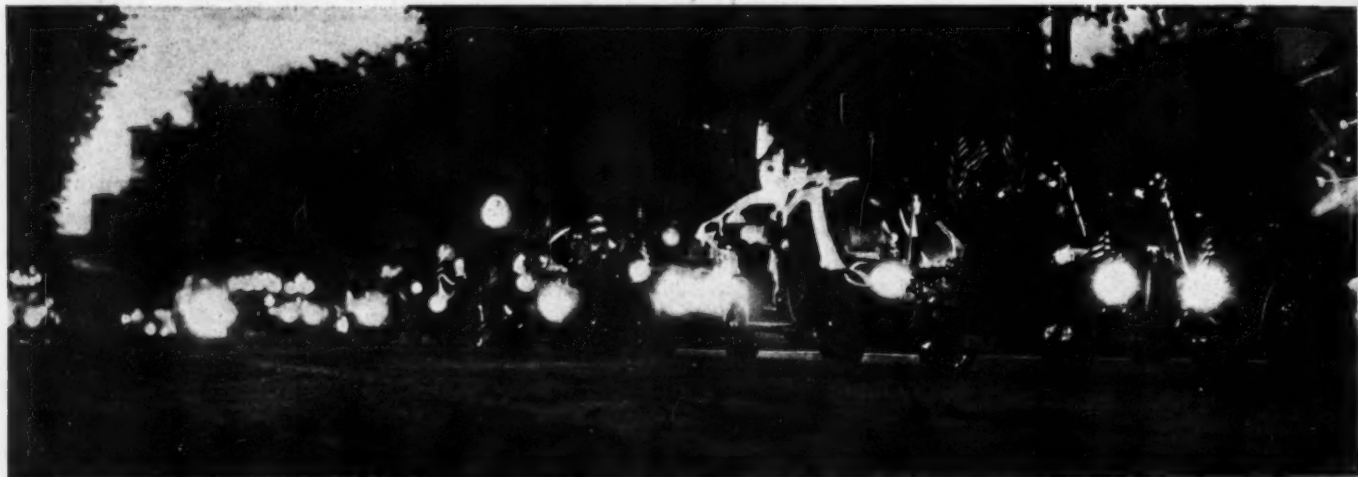
Only one untoward incident occurred, that of a fire to one of the handsome cars, driven by the daughter of C. M. Rawitzer. The red roses caught fire from the lamps, and quick work was

ing the review the guests of the day walked across the verdant parade ground to the officers' club, where they were entertained.

In the afternoon a special train took about 400 people, half of them belonging to the caravan, to Savage, Minn., to see a match race between Dan Patch and Minor Heir, the fastest horses in the world. One heat was run in 2:06 1-4, and the horses were seen for a time while warming up, while lesser lights of the stable held the attention during the process.

Sunday the tourists were given still another kind of an outing. At 9 o'clock several score of automobiles were brought to headquarters by their owners, and all the Gliddenites in sight were taken out to beautiful Lake Minnetonka for a two-hour ride. Dinner was taken at the Tonka Bay Hotel, and once more the cars were pressed into service to convey the guests to the Automobile Country Club for a buffet supper. The club has a superb location, and 'tis doubtful if any other automobile organization is so ideally situated.

**The Last Day of the Tour**—When Dai Lewis made the pathfinding trip he took six days to cover the 154-mile route between Madison and La Crosse which the tourists were required to cover in 8 hours and 42 minutes. "I admire your nerve in coming in on the hour," said one driver, "after having laid out that route. I certainly would never have taken the same chances,



As the Illuminated Parade Progressed Through the Streets of Minneapolis, the Sight Was Inspiring to the Beholder

necessary on the part of the young women in the machine to escape. It was too badly damaged to continue in line.

Charles J. Glidden, Frank B. Hower and Col. W. W. Brown were the judges. After the parade the *Minneapolis Tribune* served a Dutch luncheon to a number of the tourists. Joined with them were officials of the local club, the State association and newspaper men.

Friday evening, that of the arrival of the contest, was given to the men for rest. In honor of the officials of the tour, the officers of the Minneapolis Automobile Club gave an informal dinner that evening in the West Hotel. Among those present were Col. F. M. Joyce, Minneapolis State Association; H. W. Lowry, president of the Minneapolis Club, and Asa Paine, an ex-president.

Saturday morning the real entertainment began, with an excursion to Menneha Falls in chartered trolley cars. The club members had rightly decided that their guests would not appreciate rides to and from this beauty spot in autos. The walk was around the falls, to the ravine at the bottom, and then up on the other side to the cars again. Fort Snelling was next visited, to witness a review in honor of the autoists. There were eight companies of the 28th United States Infantry, a platoon of machine guns, and the 2d squadron of the 4th Cavalry on parade, and they made a beautiful showing. The bronzed veterans have but recently returned from Cuba, and had seen service both there and in the Philippines, so the maneuvers were a treat. The reviewing officer was Lieut. Col. Silas Wolf. Immediately follow-

now you may depend upon that. All that saved your life was the fact that it did not rain." Lewis smiled, and his reply was disquieting. "You think La Crosse to Madison tough? Just wait until the last day of the tour. Then you will see something." On that basis those who have lost points have failed to worry, as they believe that they will have plenty of good company before the tour ends, especially if rain should set in and stir up the roads, converting them into a muddy paste that will be hard to drive straight on.



Asa Paine's Winton Contained a Bevy of Beauties





## HOW TOUR PROGRESSED FROM CHICAGO TO FORT DODGE

ENTHUSIASM marked the progress of the tourists through the States of Wisconsin, Minnesota, and part of Iowa. Not only was the tour made welcome, but the rural population turned out *en masse* to watch the cars pass and to speed them on their way. The roads showed a vast improvement over those just traversed in Indiana and Illinois, which, with the enthusiastic reception accorded by the people, made the going more enjoyable for the contestants themselves and the numerous newspaper men. The only thought that spoiled the enjoyment was of the conditions to be met with farther on, which Dai Lewis felt free to state was much worse than anything heretofore. With this in mind, the drivers exercised much care.

### THIRD DAY—CHICAGO TO MADISON, WIS.

175.2 Miles

MADISON, Wis., July 14—There was some keen enjoyment in the run here from Chicago. Furthermore, the escape from the so-called "Windy City" lay through its most beautiful sections, including the Lake Shore drive, Lincoln Park, and then Sheridan road. Surely the man who labors during the day in the murky and disheveled town must appreciate lovely Evanston when he arrives home at night; and Kenilworth, Glencoe, Highland Park, and other succeeding places located on the shores of Lake Michigan are similarly inviting. A look at Zion City gave one the idea that it no longer had the directing hand of a capable manager, for, despite his peculiarities, Dowie possessed rare business ability.

Kenosha, home of the big Rambler plant, and also noted in automobiling for the Solar lamps of the Badger company, figured as the first city entered in Wisconsin. While there were no Ramblers in the tour, one of the notables met in the main street was Thomas B. Jeffery, in a runabout driven by his son, and that the veteran maker, first of bicycles and then automobiles,

was interested in a look at the dirt-daubed cavalcade required only a hello to the man who refused to become involved in the Selden litigation.

Mitchells were numerous in Racine, though few of the company's officers apparently took time to see the Gliddenities. Sales Manager Gilson had seen the start at Detroit, and admitted that this year the long route had no charms for him. He and Al Reeves, however, watched the cars fly into the outskirts of the town. The KisselKar plant being located at Hartford, it was natural that cars of this make in demonstration form were to be observed in the vicinity of Milwaukee.

Prompt and generous hospitality came to the tour party during its Milwaukee stop, the refreshments including all the beers that have "made Milwaukee famous." The officers of the Milwaukee Automobile Club saw to it that everything was done that "Jim" Drought has mentioned the night before in Chicago, for he was "taking a day off" by riding in the Premier pacemaker of "Napoleon" Hower.

Wisconsin supplied roads that proved an appreciated improvement over the alleged highways of Michigan and Illinois, and, excepting a stretch of about 15 miles between Waterloo and Watertown, the going bothered the contestants slightly, though Madison certainly presented an inviting appearance when reached late in the afternoon. Here is located the University of Wisconsin, and it is not boasting for the Badgerites to say that their institution of learning has the most advantageous and picturesque site of any college in the whole country. Lake Mendota is a lovely sheet of water, and its sister lakes are scarcely less beautiful. Though no set form of entertainment was provided, many of the party were shown the beauties of the model little city, Glidden, the globe-girdler, arousing pardonable local pride by comparing it to Athens, which was not very far-fetched for a good illustration. The Governor was absent, but Colonel Munson, his private secretary, assisted the officers of the Madison



Veteran "Teddy" Day, Who Again Pilots a Pierce

Automobile Club in the courtesies showered. It followed as a natural sequence that "Jim" Drought had a hand in the proceedings.

**Two Cars Met with Penalization**—Rough as some sections of the route were, and as fast as was the time made when the fine roads presented themselves, the Gliddenites had no perceptible trouble, and not a single penalty was inflicted in the ranks of the Glidden or Detroit trophy cars. There were two among the runabouts which felt the pen of the scorer, however, and one of these felt something still harder. This was the little McIntyre high-wheeler which jumped down an embankment before reaching Milwaukee and there remained. Its driver, Frank Goodwin, later stated that his car got caught in the tracks of a trolley line. When it did jump out and extricate itself a nut on the steering system dropped off, and the car was ditched and damaged beyond immediate repair. Neither driver nor observer were injured. It was not expected that the McIntyre would go very far without penalization, for the required speed was too great, but it was hoped that it would make a fine showing for the motor-buggy industry. On the first day it was 29 minutes late, and on the second this was increased by 423.7 points, so that its total, when the 1,000 for withdrawing was added, arose to 1,452.7, a penalty incommensurable with its trouble. The sturdy little Brush runabouts are in for endurance, and it is not expected that they will keep the time schedule. Consequently it is understood that the entrants intend to continue just to demonstrate their ability to cover the distance at a pace suited to their size and power. The one driven by Huss was the other of the two machines penalized to-day.

The running time for the 175.2 miles was 8 hours 50 minutes, an average of 20 miles an hour being required of the class A cars, those selling for \$3,750 and upward, and, as usual, a proportionately lower rate for the smaller machines.



Charles Goldthwaite, Who Drives the Maxwell Runabout

## FOURTH DAY—MADISON TO LA CROSSE

154.4 Miles

LA CROSSE, WIS., July 15—One could easily have imagined himself in Vermont to-day, for the country bore a striking resemblance to the Green Mountain State. Leaving Madison, the little gem of a city, and taking a parting view of its quartette of lakes, the Wisconsin river was crossed at Sauk City, just below which is Prairie du Sac, the two dwelling in peace and harmony and advertising their advantages jointly.

Baraboo is an enterprising and substantial town which deserves to have its name writ large for the reading of automobilists. With its own money, and no help from the State, it has constructed miles of good roads in its vicinity. As the flying procession passed through Baraboo's well kept streets there was a shout of welcome that had the genuine tone in it; and this same kind of greeting seldom had a dissenting voice all the way to this lively burg grandly located on the Mississippi. Reedsburg, however, particularly warned the travelers not to go faster than 12 miles an hour, but, with the exception of a short stretch of brick pavement through the main street, this was plenty fast enough.

Once the route led for several miles on a crossroad that divided fields of grain. The explanation of this sandy substitute for a road came from Pathfinder Lewis, who said that when he laid out the tour in the Spring the main road was impassible and someone directed him to this little used sand track. At any rate it contributed something to the diversified character of the day's running, which presented much to please the eye even if it included road surfaces of changeful moods. For the first time in the tour one met with and cursed the waterbreaks that infest Pennsylvania mountain roads.

Between Kendall and Sparta three ridges were climbed and descended, which caused distress to nearly every car in the tour. The presence of waterbreaks added to the task, and all uttered words of thankfulness when gliding into hospitable Sparta, the automobile club of which tossed lunches and drinkables into the laps of the car occupants. The remaining 25 miles of the journey had no incidents worthy of note, though mention should be made of the fact that there was some "beating" to keep free from time penalties.

To a number a pleasant feature to-day happened just beyond Wilton. After climbing a long hill two of the press cars and the Jewell roadster came upon a Pierce-Arrow picnic party. The photographers stopped a moment to take a picture, and in the meantime the hungry men discovered what they voted was the best cake in the State of Wisconsin. The car belonged to La Monte Rollands of Tomah, and with him were W. R. McCall and L. M. Compton, and party of ladies.

**How the Contestants Progressed**—A single penalization was inflicted in the Glidden ranks, and it was for work of little consequence. The Midland, driven by E. O. Hayes, in crossing one of the terrible waterbreaks in the semi-mountains, scraped its dustpan upon the ground. To straighten this required 15 minutes of work, thus giving the car a demerit of 1.5 points. Shortly after this the left front fender broke loose, and wire and strap were procured with which to fasten it. The cost of the material was 30 cents, for which the penalty was .6—double the one-tenth system because the material was purchased. It took 16 minutes to fix this, so that the total penalty against the car is 3.7 points.

The Detroit trophy trio kept their ranks intact.

Howerites were far less fortunate, for penalties were inflicted upon five of them, four of whom had previous clean bills of health. The lowest was that of the Mason, driven by Roy Snyder, which was given 2.4 points, divided into 2.2 for labor in changing a petcock from the radiator to a cylinder head, and in plugging up the vacancy in the radiator. For the wooden plug used in the latter instance the charge was .2. The Maxwell, driven by Goldthwaite, took slightly more—2.6 points. A spring clip on this machine gave way yesterday, and the crew was undecided as to whether to use a new one or not, for the car



# WHILE THE TOURISTS WERE AT CHICAGO



"The Rivals"  
Spooner and  
Lezarnick



President H.N. Van Sicklen — President H.M. Swetland  
Automobile Blue Book Pub Co. Class Journal Company



Pilot Lewis and  
Secretary Ferguson  
compare notes



Tourists arriving at  
Auditorium Annex,  
Chicago



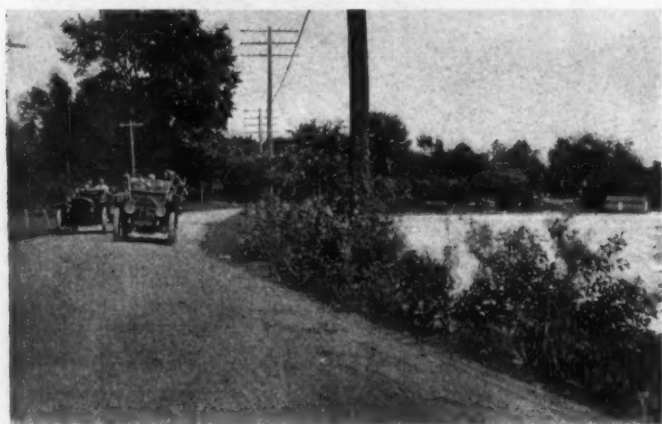
Crossing Flatlands  
south of Chicago



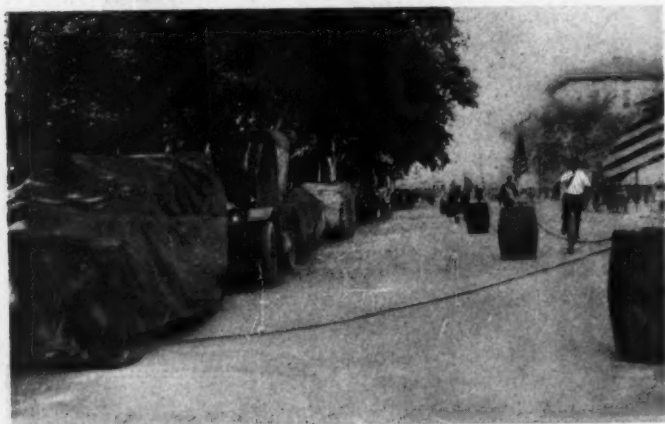
Cavalcade departs  
for Minneapolis



Press Men Extinguishing Grass Fires in Wisconsin



Along the Shore of a Beautiful Wisconsin Lake



Where the Cars Were Parked for the Night at Madison



Sauk City Tenders the Tourists a Cordial Welcome

might have traveled without it. The rough roads to-day were sufficient to show that no risks should be taken, and so W. F. Smith, the Maxwell manager, instructed Goldthwaite to put in a new one. For the clip the damage was .4, and for the labor it was 2.2.

The rules this year might confuse those not intimately familiar with them in certain points, as illustrated by the case of the Maxwell. The clip cost 20 cents, or, at least, over 10; but, inasmuch as it was not carried at first, the score was doubled and, as the 11 minutes spent in adjusting it were upon such an article, the time was marked up double.

The Jewell roadster, driven by John Shimp, was nine minutes late—its first penalty.

Two other cars whose records were touched did not fare so easily. These were the Hupmobile and the Brush, driven by Huss. The former had been able to maintain the hard schedule on the roads of the first three days with little trouble, but the precipitous hills of to-day were too much for the little car, and it was marked 358 points for lateness. Its companion in trouble was another of the little fleet, which found the grades very steep for a one-lunger when combined with time necessary for certain adjustments. Two connecting rod bearings were used, and in all the material and labor counted for only 8.9 points, with 335 points charged for tardiness, so that its score was increased to a total for four days of 957.6.

The other cars were all classes and had no difficulty in negotiating the route, although a number of them steamed on the heavy climbs. The conservative methods of driving were less in evidence, perhaps because time had to be made up whenever possible. Considerable tire trouble was noticed.

## FIFTH DAY—LA CROSSE TO MINNEAPOLIS

177.8 Miles

MINNEAPOLIS, MINN., July 16—Pleasant valley to-day elicited the encomiums of the lovers of scenery, and one would have to go a long distance to find its superior in quiet beauty in this big land of ours. Dai Lewis had incidentally mentioned the existence of this valley, but few were prepared to enjoy such a gorgeous prospect of nature as was discovered some 25 miles from La Crosse. Next came the Stockton valley, with additional loveliness in the way of foliage-bedecked hills that closely approached mountains in size, and again followed a reminiscence of the Green Mountains and the Berkshires of Massachusetts.

Emerging from the hills, the miles of grain fields stretched in all directions, and then one began to understand the source of the real wealth of the Northwest. Signs of prosperity abounded in the waving seas of wheat and oats, and corn, and the farmers gazed at the motor-driven brigade with friendly eyes, and their greetings bore tokens of unmistakable friendship. For the man on a Minnesota farm there could be no greater boon than the automobile; furthermore, he is appreciating the fact by buying cars, as was made apparent again and again at the crossroads gatherings where invariably there were one or more autos to be seen.

Lewiston, Utica, St. Charles, Dover, Eyota, Chester, Rochester, Orinoco, Pine Island, Zumbrota, Cannon Falls and Hampton were among the flourishing communities passed through on the way to St. Paul, which is only 10 miles from its sister city, though one is constrained to note the absence of very much sisterly affection.

It was a triumphal progress that punctuated the tour's arrival in Minneapolis, after being met in the outskirts by a delegation from the local automobile club, which included President Lowrie and other officers. President F. M. Joyce, of the Minnesota State Automobile Association, to-day came with the tour on its 177-mile run, and there seems to be no hesitancy whatever on the part of anyone to give full credit to him for the excellent condition of automobile affairs in the State.

**Penalizations Were Few**—When the route of the tour was first spoken of the officials stated that there would not be a per-



fect score, and when Pathfinder Lewis returned from his prospecting with long tales of the road conditions the contention was believed. There are those among the tourists to-day, however, who are thinking that this must apply to the country beyond. At any rate the 13 Glidden cars and the three Detroit trophy ones performed as usual without a smirch on their records.

There were three inflictions among the roadsters and runabouts, but no new ones, and one of these was a withdrawal. The Jewell added 6 points to its 9 of yesterday, giving it a total of 15. The items were as follows: For outside labor in re-threading a gasoline force feed pump, 3.8 points; for labor of the driver upon this, 1 point; for a hinge which cost 5 cents, .2 points; and for applying the hinge, 1 point.

The withdrawal was that of the Hupmobile, which stripped a low-gear pinion in the transmission in trying to climb the steep hills at the beginning of the journey. When this happened it was only a few miles from the start, and the car was able to get back without difficulty and obtain a new one. It is understood that

With fond recollections and thorough appreciation of the good time supplied by the Minneapolis club, the contesting part of the tour took its departure from the front of the Plaza Hotel at 8 o'clock. The trip here owing to the favoring weather conditions proved easily within the capacity of all of the cars. Of hills there were none worthy of the name, and the scenery had almost exclusively the look of the fields, seas of grain frequently encompassing the horizon on all sides. St. Paul waylaid the tour shortly after it left the rival sister city, and the cars were deviated from the street and into the big auditorium, where into the laps of the occupants were thrown cigars and candy and other souvenirs of the city, including a miniature of St. Paul himself.

Northfield, some fifty miles from Minneapolis, attracted attention because of the fact that it was here on September 7, 1877, that Jesse James and his gang met with their first Waterloo, two of the gang biting the dust, though two townsmen were also killed in repelling the attempt to rob the bank.

Enthusiastic welcomes pleased the tourists until one got tired



A Big Tent Filled with Refreshments Was Provided for the Hungry Tourists by the Milwaukee Automobile Club

the car will continue as a non-contestant. The Brush naturally contributed to its increasing total, the 294 points giving a total of 1,251.6. Of that to-day 285 was for lateness and 9 for labor. The score of the other Brush was given out this evening as incomplete because in coming into this city Trinkle went according to the route book to the Plaza Hotel instead of following a change to the West Hotel. It is probable that his application for an allowance, inasmuch as he waited after arriving at the Plaza, will be granted and his story is substantiated by the observer.

## SIXTH DAY—MINNEAPOLIS TO MANKATO

132.0 Miles

MANKOTA, MINN., July 19—When Dai Lewis laid out the route of the tour in the Spring one of the toughest stretches that he encountered was between Minneapolis and this city. A good part of the way consisted of what are known in this country as "gumbo" roads, which in the rainy season are well-nigh impassable. Even with a hard downpour of a day the going is exceedingly difficult, and it was for this reason that the run to-day was made of only 132 miles, coupled with the additional fact that the next big town where hotel accommodations were procurable was too far away.

of waving answers to the flag and handkerchief and other salutes which punctuated progress through every town and village, with equal enthusiasm, though necessarily intermittent, in the country.

Owatonna contributed the noonday luncheon, its automobile association doing the honors, with wives and daughters of members serving the refreshments, which included the best butter-milk ever tasted. Owatonna is the biggest town in Steel county, which annually produces about three million pounds of butter and holds the national championship in the quality of its dairy achievements. The president of the local club is Senator T. H. Cashman and the secretary is Dr. A. B. Stewart. In the absence of the president, G. A. Merrill directed affairs in a most satisfactory manner.

Of course to-day some more of the three thousand odd lakes in Minnesota were sprinkled through the country traversed, and several possessed uncommon beauty, Elysian lake probably carrying off the honors.

Mankato with its solitary big hotel had some difficulty in housing the party, some of whom passed the night in homes of residents who volunteered to meet the needs of the overflow.

To-morrow night at Fort Dodge, Ia., will begin the ten days' occupation of Pullman sleepers, and it must be confessed that the prospect is not viewed with any vast amount of enthusiasm.



Webb Jay in Premier Checking Out at Minneapolis

To-night Globe-Girdler Glidden announced that if next year's tour is a San Francisco-New York affair he will drive a car himself in the non-contesting division.

The local club is supplying entertainment to-night to the visitors, a band concert, ride on the Minnesota river, and a Dutch lunch being included in the festivities. The journey to-day having been so easily accomplished, the recipients of the courtesies are in mood to enjoy the occasion.

#### Penalties Inflicted on the Sixth Day

The cars to-night are parked on a historic and bloody spot. On the day after Christmas, in 1862, thirty-eight belligerent Sioux Indians were captured by the United States troops and strung up on the very half-acre where the cars now stand shrouded in their tarpaulins.

All the machines seem to be in splendid order, and little change was made in the standings to-day. Only one Gliddenite had to suffer, and that was the Chalmers-Detroit, driven by William Bolger, which had to tighten a loose fender iron which has been giving trouble for some time. There was more alteration in the standing of the Hower trophy contestants. The Jewell roadster, in charge of John Shimp, spent so long tightening hub flange bolts this morning that 5.6 points were chalked up against it, with an extra 0.2 point for a washer used. The total of this car has therefore grown to 20.8 points. The Mason's score has been increased from 2.4 to 4.3 points, on account of some work done on the run from Madison to Lacrosse last Thursday. The 1.9 difference is the price of making a wooden plug for the bottom of the radiator to replace a pet-cock transferred to the cylinder head. The repair was so complicated that the committee has only just decided the penalty.

The two little Brushes have been withdrawn, the entrant stating that the schedule has been found entirely too strenuous for a 7-horsepower, single-cylinder runabout. The marks given them on the runs from Madison to Lacrosse and from Lacrosse



J. A. Wicks in Moline Car Near Pine Island, Minn.

to Minneapolis have just been announced. On the former, the mark was 3.0 points, being 0.6 for a new radius rod and 2.4 for the labor of putting it in place. On the following day another radius rod had to be used, but only eight minutes were spent putting it in place, so that this penalization was 1.6 points, making a total for the little car of 5.2. Dwight Huss, too, had considerable trouble, as expected. Both cars, of course, get the maximum penalty of 1000 points for their withdrawal. However, they will continue with the tour as non-contestants.

The little Hupmobile arrived this evening and was given a warm reception by the crowd. It is now being driven by A. E. Nelson, the designer, in place of Frank Striman. Two of the non-contesting cars met with mishaps during the day's run. The second pilot car, used in following up Dai Lewis and in further distributing confetti, was nearing Faribault on the sun-baked gumbo roads when the right steering knuckle gave way, and the car had to stop on the border of a cornfield. Mortimer Reeves, with his bag of "scent," was taken on in Chairman Hower's pacemaker. The driver took the broken knuckle into Faribault and had it welded at the local smithy's. The car arrived late in the evening.

The Maxwell, carrying a number of Chicago newspaper scribes, reported with a bent front axle, the bend coming between the spring seat and the right wheel. The accident was in no way the fault of the car. It happened while turning from the road to allow one of the Pierce roadsters to pass. This courtesy is granted by all non-contestants to the real tourists, but the reward of virtue in this case was that the wheel dropped into a hole so large that it nearly disappeared from sight. The axle was straightened this evening, although the mishap did not prevent the car from coming into the city easily.

Strange to relate, tire troubles were numerous, due possibly to the fact that the pneumatics are beginning to feel the strain of the thousand miles that have already been put behind. Then, too, the speed was greater than usual, and at the same time there were numbers of right-angled turns. None fell behind the schedule because of punctures or blow-outs, but not a few had their innings along the roadside in the 132 miles.

#### SEVENTH DAY—MANKATO TO FORT DODGE

138.6 Miles

FORT DODGE, IA., July 20—Down into Iowa to-day straggled the goggled-eyed caravan, with the same interminable line of roadside onlookers waving and shouting greetings, and at two places contributing to the demands of the inner man. The route was almost due south, and the gumbo brand of road continued its rough, though dustless, course into Iowa, the line being crossed just outside of Elmore, where the townsfolk supplied buttermilk in generous quantities. Occasionally the gumbo had been dragged, but more frequently its roughness compelled a speed of not more than twelve miles an hour. Algona, 93 miles from Mankato—thanks to the liberality of E. E. Connors—supplied luncheon and some drinkables, though the town is "dry."

Soon afterwards a sign across the road indicated the county line of Humboldt County, and for some twenty-five miles the going proved most enjoyable. Then there came an abrupt return to the gumbo, continuing almost into Fort Dodge. The town to-day is agog with the Barnum & Bailey circus and filled to overflowing. However, many must have put off the show till to-night, as the streets were alive with people when the cars began to arrive in the public square. The reasonable schedule for the 138 miles had in view the possible effects of rain on the gumbo, and as there was no waterfall, the tourists could take things quite easily. The weather to-day has been scorching hot, but a breeze saved the tourists from feeling its full effects. In Fort Dodge the thermometer showed 115 degrees in the sun and 95 degrees in the shade, and it is said that a hotter day has not been experienced in years. The party is finding sleeping cars a bit uncomfortable to-night.

E. L. Ferguson had a narrow escape from serious injury to-

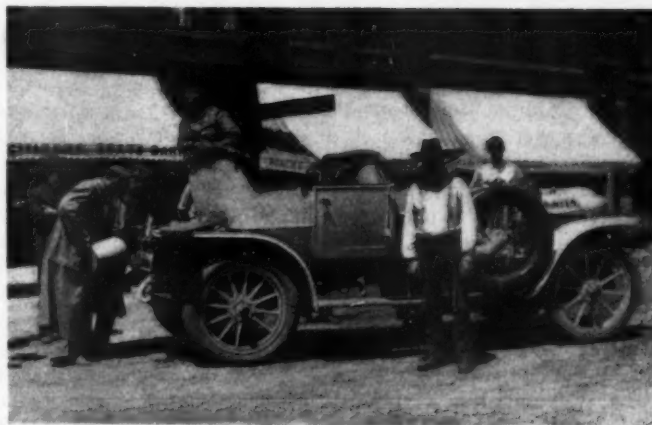


day. His Acme hit a culvert near Eagle Grove, Ia., and the car and its occupants were thrown through a barbed-wire fence into an adjacent corn-field. In trying to save himself Ferguson caught hold of a strand of the wire, which slipping tore long gashes in his hand and broke several of the small bones. The injuries were dressed by a local surgeon. Ferguson caught the special Pullman train on its way here. He will continue the tour, but *a la* Pullman instead of Acme.

Although the cars to-day at times had exciting escapades, and three of them learned that Iowa roads are not always what they seem, penalizations were few. The Maxwell roadster, driven by Goldthwaite, received 1.6 points for labor in stopping a leak around a cylinder valve cage. The Midland got 0.6 points for tightening a fender iron. The Chalmers-Detroit stopped to tighten a connecting rod bearing, for which it received 17 points, plus 187 points for the ensuing lateness.

During the day the Mason Hower contestant pulled to one side to allow another car to pass, and as reward for its politeness its wheels sank immediately into the gumbo so that it could not get out under its own power. The Midland, which is running under the Glidden flag, was the next along and it was successful in landing the Mason and its crew on firmer ground. The other cars to get in trouble were of the non-contesting division. The Rapid truck, which seems to be followed by a specially active hoodoo, turned out for a hay wagon just outside of Algona, and immediately slid off the road into the ditch. It was rescued by a couple of the other cars without suffering any injury. The Maxwell press car ran out of gasoline and was pushed to one side to allow one of the Chalmers-Detroit cars to pass. It also sank into the gumbo so that outside aid became necessary. H. C. Marmon gave some help, but his time was necessarily limited and he had to go on. Finally man's best friend, so alleged, the horse, was pressed into service for the first time on the trip. The Studebaker-E. M. F. car which was delayed yesterday had more serious trouble this morning. The left half of the drive axle crystallized and gave way at Vernon Center, only 21 miles from Mankato.

The machines which received penalties as a result of to-day's trip had all lost their clean records previously. To-morrow there will be some tough hills in the 185 miles to Council Bluffs and the predictions are many that the scores will be changed by nightfall. Rain has fallen recently in the roads to be traversed within the next few days and the roads are reported to have suffered severely.



Replenishing the White Steamer with Kerosene

### A FEW OBSERVATIONS MADE EN ROUTE

In These Long Tours it has come to be business pure and simple, and no horse play. One man, and he was a maker, gave it out cold to his men that things of late had changed and that all horse play, late hours, and cutting up would have to be dispensed with." I am not out for the fun of spending a few thousands of dollars for my firm just to let some men have a good time," said this man. "My men are out to win the trophy, and they are going to start every morning in shape to make a hard drive. Horse play is all right in its place, but the time for such doings is not on a tour when results count for so much."

Hats Are Various and Many in style on the trip. Every time a hat store on the line offers anything outlandish in the way of a chapeau the tourists go right after the novelty and buy out the dealer. Lots are not large in the way of bargains that are wearable, and so the great variety. Khaki, however, as a touring uniform has come to be quite the style, and nine-tenths of the tourists wear suits that seldom cost more than \$5. Although cheap, the suits look well, and the men appear to better advantage than in dusty business clothes.

The Underwood Typewriter Company supplies typewriters at many of the points on the route, and these machines are placed in press headquarters, much to the delight of the press men.

### THE TABULAR STORY OF THE BIG TOUR AS IT PROGRESSES

GLIDDEN TROPHY													
No.	Car	H.P.	Cyl.	Bore	Stroke	Driver	1st Day	2nd	3rd	4th	5th	6th	7th
1	Premier.....	32.4	4	4 1/2	5 1/4	Webb Jay.....	0	0	0	0	0	0	0
2	Premier.....	32.4	4	4 1/2	5 1/4	H. Hammond.....	0	0	0	0	0	0	0
3	Chalmers-Detroit.....	40	4	5	4 3/4	William Bolger.....	1	0.4	0	0	0	0	187.0
4	Marmon.....	32.4	4	4 1/2	4 1/2	F. E. Wing.....	0	0	0	0	0	0	0
5	Marmon.....	32.4	4	4 1/2	4 1/2	H. C. Marmon.....	0	0	0	0	0	0	0
6	Maxwell.....	28.9	4	4 1/2	4 1/2	E. G. Gager.....	0	0	0	0	0	0	0
7	Jewel.....	36.1	4	4 1/2	5	O. P. Bernhardt.....	0	0	0	0	0	0	0
8	Pierce-Arrow.....	48.6	6	4 1/2	4 3/4	F. S. Dey.....	0	0	0	0	0	0	0
9	Pierce-Arrow.....	48.6	6	4 1/2	4 3/4	W. F. Winchester.....	0	0	0	0	0	0	0
10	Glide.....	36.1	4	4 1/2	5	A. Y. Bartholomew.....	0	0	0	0	0	0	0
11	Thomas.....	72.6	6	5 1/2	5 1/2	G. B. Buse.....	0	0	0	0	0	0	0
12	Midland.....	32.4	4	4 1/2	5 1/4	E. O. Hayes.....	0	0	0	3.7	0	0	0.6
14	White.....	40	..	..	..	H. N. Searles.....	0	0	0	0	0	0	0
DETROIT TROPHY													
51	American Simplex.....	50	4	5	5	W. A. Wood.....	0	0	0	0	0	0	0
52	Chalmers-Detroit.....	40	4	5	4 3/4	Jean Bomb.....	0	0	0	0	0	0	0
53	Premier.....	32.4	4	4 1/2	5 1/4	Cliff Waltman.....	0	0	0	0	0	0	0
HOWER TROPHY													
100	Moline.....	32.4	4	4 1/2	5	C. H. Van DerVoort.....	0	0	0	0	0	0	0
101	Moline.....	32.4	4	4 1/2	5	J. A. Wicke.....	0	0	0	0	0	0	0
102	Moline.....	32.4	4	4 1/2	5	W. S. Gregory.....	0	0	0	0	0	0	0
103	Brush.....	7	1	4	4 1/2	F. A. Trinkle.....	0	0.4	0	*	*	Withdrawn	Withdrawn
104	Brush.....	7	1	4	4 1/2	D. B. Huss.....	40.8	149.3	423.6	343.9	294	Withdrawn	Withdrawn
105	Chalmers-Detroit.....	40	4	5	4 1/2	John Machesky.....	0	0	0	0	0	0	0
106	Hupmobile.....	16.9	4	3 1/2	3 3/4	Frank Steinman.....	0	0	0	358	1000	0	0
107	Maxwell.....	28.9	4	4 1/2	4 1/2	C. E. Goldthwaite.....	0	0	0	2.6	0	0	1.6
108	Pierce-Arrow.....	38.4	6	4	4 1/2	J. S. Williams.....	0	0	0	0	0	0	0
109	Pierce-Arrow.....	38.4	6	4	4 1/2	Chas. Schofield.....	0	0	0	0	0	0	0
110	McIntyre.....	18	2	4 3/4	4 3/4	Frank Goodwin.....	29	423.7	1000	Withdrawn	0	0	0
111	Jewel.....	36.1	4	4 1/2	5	John Shimp.....	0	0	0	9	6	5.6	0
112	Mason.....	20	2	5	5	R. Snyder.....	0	0	0	2.4	0	1.9	0
114	Lexington.....	36.1	4	4 1/2	5	J. C. Moore.....	0	0	0	0	0	0	0

## HEARD AND SEEN ALONG THE ROUTE OF THE TOUR

**How Moline Squadron Travels**—While the regulations allow each car to carry a sack of extra parts for replacement in case of a breakdown, the three Molines which constitute the "Moline Dreadnaught Squadron," are traveling without a single piece of additional equipment. The Molines are the only cars which are not equipped with a bag full of extra parts. When asked why he was taking this unnecessary chance, President W. H. Van Dervoort said: "When an owner starts on a tour he is not equipped with extra parts. The Glidden tour is to demonstrate what the motor car can do under regular touring conditions, and we are endeavoring to demonstrate that Molines can travel 2,600 miles without replacements of any sort. Our perfect scores bear us out in this respect. Personally, I would like to see the extra parts eliminated from the rules." Too bad this very commendable attitude is not taken by all contestants.

**"Jehosaphat, Boys! It's a Scarecrow!"** said F. Ed. Spooner, just outside of Union Center, Wis., after members of the party in the No. 89 Studebaker press car had waved their arms off at a lady (?) in the field who was apparently busy with hoeing and had just raised up to watch the autos go by. The tourists like to receive recognition from the people along the route and upon finding a "frozen face" always try to make her smile or wave her hand, and then say "Thank you." This particular lady, well dressed and to all appearances good looking, would not show the slightest sign of recognition, and the Studebaker slowed up to try and make her do so, the men rising up in the car to do homage to her beauty. The discovery that she was a scarecrow quite unnerved them, and after that they were not so enthusiastic in trying to make anyone wave.

**An Observer on the Brush** did not know that the speedometer of the little car was out of order. He watched it closely and noted that it registered 55 miles an hour regularly. "Say," said he, "we'll just about be up to the big fellows before long, won't we?" Another observer who made the trip in the little Brush said: "I tell you that I had about the most remarkable ride I ever took. I would never miss one ride of the kind for the world; but never again. I've had my time of it. Why, Tinkle just opened the little car wide, and then held it right down to hard tacks regardless of the road conditions. We went over the bumps at full speed, and we flew, or it seemed to me we did. And with that sort of work the little car held together, and we arrived on schedule time by a narrow miss only."

**The White Steamer Quartette**—A quartette has been organized by the crew of the White Steamer, the car which is making a highly successful demonstration of the use of kerosene as fuel. As might be expected, the vocal efforts of the quartette are devoted mainly to exploiting their use of the new fuel. On entering each town they attract attention and applause by rendering the following song to the tune of "No Wedding Bells for Me":

No gasoline for me,  
It's as dear as it can be.  
Kerosene is what we're using,  
Old John D. is surely losing,  
Three cheers for kerosene,  
No gasoline for me.

**"Tain't No Race, Then!"** said one farmer. "Then I don't see why we folks are so interested, by Gol. We came a darned long way to see this 'ere race only to find that it ain't a race at all. I'm plumb disgusted with myself, for my hay's laying there, and, by Gol, I believe it's going to rain. As long as 'tain't no race I don't suppose you people 'll care, for you can get in any old time." Informed that to get in ahead of time was as expensive in the contest as to get in behind time, he scratched his head. "You call it a contest, by gosh, and then you say it ain't a race; and ain't a race a contest—that's what I want to know." Time was precious, so the gentleman from rural Wisconsin was left still puzzled about a race that wasn't a race.

**"I Find the People Very Cold** and distant when going through the towns early in the morning," said Chairman Hower, "but I understand from those who bring up the rearguard and try to keep out of the dust that the people have warmed up toward the last and throw flowers, kisses, and all sorts of bows and smiles at the tourists. I presume that I start the training of the masses, and others who follow are quite as good teachers." The chairman was right, for those who trail are the men who have the real fun and who lose the monotony of the journey through the reception accorded all along the line. Perhaps the chairman thinks that people who get up early ought to be good natured.

**In Days of Old "When Knights Were Bold"** the tourists oft-times heard disquieting reports of obstructions on the roadways to be followed and scout cars were sent out to clear the way. There was antagonism in those days against the tourists. All that has changed now and farmers make Glidden Tour Day a holiday, bring their family and friends and hold a picnic by the roadside, cheering the contestants on. In days of old speed traps were set to catch the tourists, but to-day the policemen in all of the towns en route push the tourists on and give them a cheer for every ounce of speed they put on.

**Things Have Changed** within a very few years. All antagonism has apparently disappeared and farmers cheer the tourists lustily and wave to them to go faster. The automobile has come to stay, and its beneficial effect has been noted by the farmer, who is not unappreciative of the good roads movement now so successfully launched. The farmers own automobiles, and want good roads, and know that the autoists of the entire country also want them, and are working tooth and nail to benefit the farmer as well as themselves. Conditions will improve more and more as the years go by.

**Charles J. Glidden Predicted** at Minneapolis that within five years the men who kick about the roads and the stiff schedules will be looking from above on the roads they once cursed and laughing at the old days, just as the cyclists look backward to hard centuries and double centuries made on roads even worse. "Many of these men will be in the aero field," said Mr. Glidden, "and I have no doubt that endurance contests in the future will follow much the lines of our great tours of to-day, but without thought of roads. It is not impossible in fact, it is certain."

**More News Matter** is being sent out from this tour than any other. C. H. Kent, representative of the Western Union, who is making the tour in a Chalmers-Detroit car, says that an average of about 30,000 words is being sent out by his company alone, and P. S. Williams, of the Postal Company, says his company is doing fully as well. It is not improbable that an average of 60,000 words daily for the trip would be about fair, and this will be greatly increased providing the weather changes and the difficulties become greater.

**Tonneau Is a Catch-All**—To the driver, the tonneau of a car is a catch-all and the convenience of his passengers does not enter into his mind. "Put it into the tonneau" is his regular statement and his regular habit, and those who have to travel in the back seat suffer hour after hour through inability to get their feet to the floor or to get them into a comfortable position. The observers on the tour objected to this feature of touring, and Chairman Hower, at one of the early meetings, asked that the drivers of the cars cease choking up the tonneaus.

**Talk of the "Transcontinental Tour"** is heard on every side in the touring party. Charles J. Glidden said in speaking of it: "I have talked the matter over with Mr. Hower, who is now in favor of the tour to start from San Francisco and finish in New York. The rules will be more liberal than they are at present, and I believe that the entry list will be a large one. The makers seem to want a really hard trip, and an across-country trip would be a splendid chance to bring out a record breaking list."



"Matches That Won't Blow Out," handed out by Morgan & Wright, are also the matches that set the world on fire, for the occupants of tour cars touch them to cigars or cigarettes and then throw them carelessly to one side. Sundry fires along the roadside have been caused by this, and No. 79 Studebaker, driven by George Smithson, and No. 83 Chalmers, driven by Harry Ford, stopped to relieve the anxiety of one woman near El Roy by putting out what might have been a serious fire for her.

**Photographers Are Having a Hard Time** on the trip, for the reason that the promoters failed to take them into consideration by routing the tour westward rather than eastward. Somehow the sun has been directly against the men who push the button at most of the interesting points on the route, and as a consequence the pictures of this journey have not been altogether up to the usual standard set by those who make it a business to photograph every tour.



Before Reaching Minneapolis the Route Passed Through Beautiful Pleasant Valley, One of the Gem Farming Regions of Minnesota

**Youngest Driver in the Tour**—Considerable interest is centered in the driving of W. S. Gregory, driver of the Mobile No. 102, due to the fact that he is the youngest driver in the tour. Gregory is only eighteen years of age, but is handling his big car like a veteran, and has already received compliments from many of the tourists. Gregory hails from Los Angeles, Cal., and came East purposely to drive in the great American touring classic.

**H. C. Marmon and F. E. Wing** drive the two Marmon entries with tops up, and attract no little publicity to themselves by so doing. As a rule every car is stripped right down to action for the tour, and tops are put away until after the finish, owing to the trouble they cause. In these long, hard rides the hundred-pound top hanging at the back throws a hard strain on the body, and a competitor cannot afford to take the chances.

**Rural Free Delivery** has aided in putting the farmer in closer touch with the motorist, and the increased interest shown along the line has been very marked. The farmers and their families have been seen standing at the roadsides studying the daily papers carefully every time a car passed. The lists of

starters and their numbers pasted on cards have been checked again and again.

**Dogs Were Chained as a Rule** all along the route through Wisconsin, and many a good dog was saved to posterity by this fact. Chickens have taken wisdom with age, and few chickens are caught crossing the road. The youngsters of a few years ago were frequently orphaned by the autos and grew to know that it was dangerous to cross the road as was their custom in years gone by.

**When the Panoram Was Taken** at Lake Minnetonka one man of more than average intelligence sat at one end of the line when the circuit panoram started and then ran around back of the camera and took a position at the other end of the line, appearing twice in the same picture. It is not on record that he ordered any more pictures than the man who appeared only once.

"Johnnie" Johnson, old-time "King of the Cyclists," be-

came very much excited at Minneapolis, where he is manager of the Winton branch, when his employees did some great decorating for the parade, in which the six-cylinder Winton made a hit. "Johnnie" was a member of the reception and entertainment committee and did yeoman work.

**H. O. Smith, of the Premier Company**, Indianapolis, was forced to leave the tourists at Minneapolis to go home to do a little work, but will again rejoin the party at Council Bluffs. Mr. Smith is enamored of the big tour, and has become a veteran by reason of his steady attendance in the past.

**The Rapid truck** is now starting at midnight in order that it may save delay on the road turning out for the tourists, as it does whenever a car comes in sight. The truck came through successfully from Madison to La Crosse and feels certain now of a successful trip to the finish.

**J. M. Evans, representing the Brush** in the capacity of advertising representative, feels that his subject is a good one, as the little Brush cars with but 7 horsepower are performing miracles, considering the odds accepted in participating in such a strenuous tour.

## NORTHERN TRIP OF THE GOOD ROADS SCOUT

By PATHFINDER

SEVERAL weeks ago a brief description of the trip of the New York *Herald's* White Steamer from New York to Atlanta appeared in these columns. After a week spent in the latter city, the car started northward, this time over what is known as the "capital-to-capital" route via Elberton, Columbia, Raleigh, Richmond and Washington, as shown on the accompanying map. Although no official announcement has been made, it is understood that this route was found to be, at the present time, not nearly as good as the route via the Shenandoah Valley, Danville, Charlotte and Anderson which the White covered on its trip southward.

As was anticipated by those who have had experience in southern touring, the "capital-to-capital" route, being comparatively near the coast, leads through many miles of sandy, swampy country with almost innumerable creeks which are not provided with bridges. But it was not all bad going by any means, and the scouts reported a number of localities where the roads were almost faultless.



"Capital-to-Capital" Route—Atlanta to Washington

Not in many years has the South been so stirred up as it is by this good roads project. The scouting trips have awakened a spirit of emulation so that each county is striving to excel its neighbor in good roads development and an appeal has been made to local pride, the results of which will be far reaching. The business men in the various cities are alive to the advantages which would result from having the "New York-Atlanta Highway" pass through their sections and, accordingly, each day the scouts learned of road improvements which were projected and, in many instances, work was actually started while the White was on its way northward.

Foremost among the good roads advocates of the South is Leonard Tufts, the owner of Pinehurst, the famous North Carolina resort. Mr. Tufts, when he heard of the plans of the good roads scouts, came down from his summer home in New Hampshire, hired 200 men and 100 teams and in four and one-half days constructed three miles of splendid road over which the White, with Mr. Tufts as a passenger, made an exhibition run at a rate of 50 miles an hour. Mr. Tufts is now devoting practically his entire attention, and is spending no small amount of money, in forwarding the good roads movement along the "capital-to-capital" route.

At many other points along the line special exertions were put forth to improve the roads in order that the scouts might

form a favorable opinion of the "capital-to-capital" route. Bridges were built over creeks which never before could be crossed except by fording; stumps were cut out of the road; holes were filled in and, in general, people all along the route gave evidence that they had awakened from their previous attitude of letting the roads go by default.

The arrival of the scouts in their White steamer in the various towns was the "big story" of the day in the local newspapers. Between Atlanta and Washington, they did not have a single hotel bill to pay. In some cases, the local chambers of commerce looked after this item, and in others the scouts were the guests of the city. Every town, large or small, sent out a delegation to welcome the scouts, these delegations invariably including the Mayor and other prominent citizens.

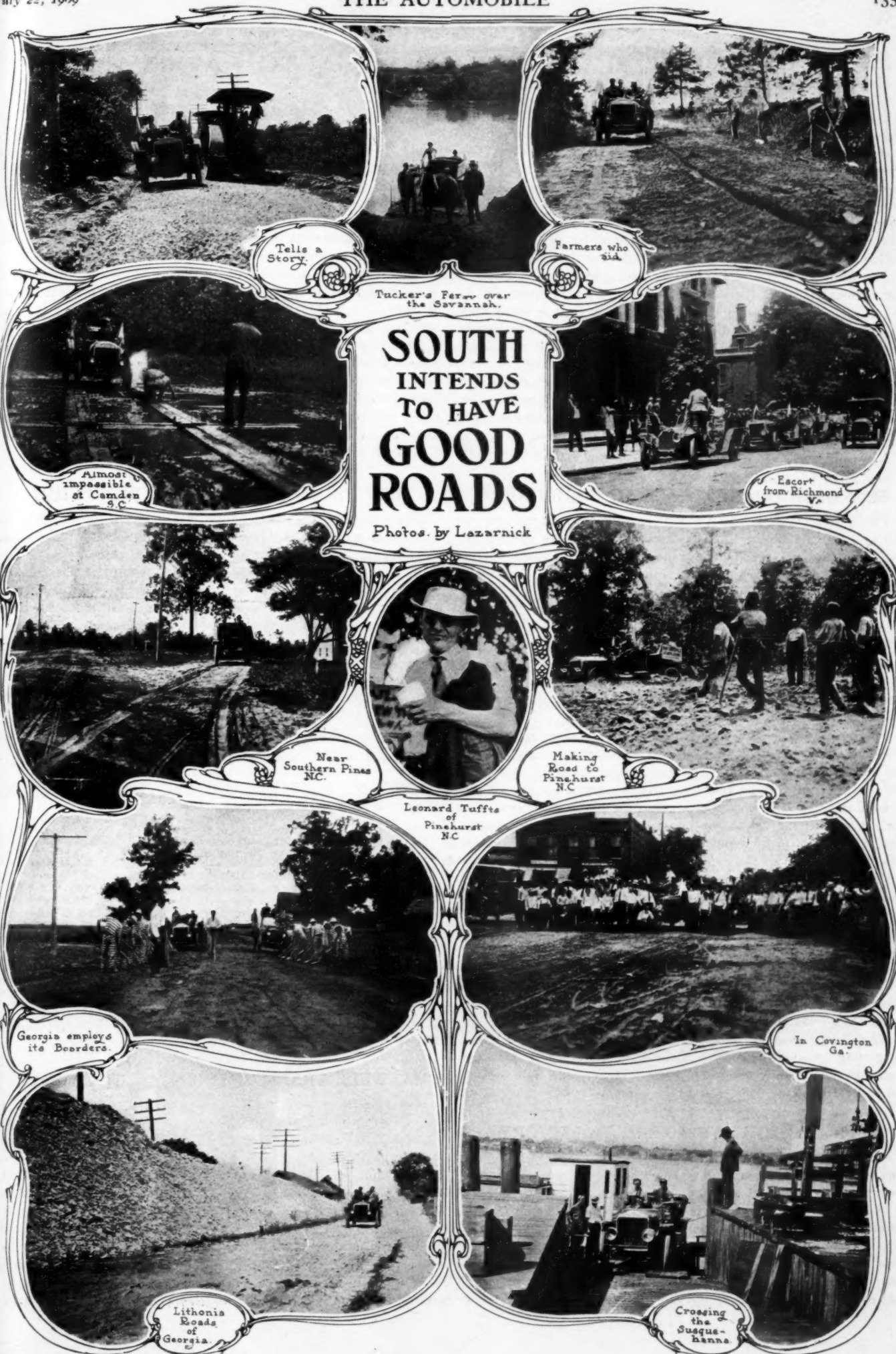
A fitting climax to the series of receptions and entertainments occurred at Washington, where President Taft received the scouts and expressed his appreciation of the work which they were doing. Furthermore, the President readily consented to pose for a picture with the scouts outside of the White House.

As pointed out in a previous article, there was a latent good roads sentiment in the South before the New York *Herald* and Atlanta *Journal* embarked in their enterprise. But it needed just such a spectacular performance as the trips over the road between New York and Atlanta to quicken and crystallize the good roads sentiment. People in Southern towns have hitherto been satisfied with conditions if they had good roads extending a few miles from town in each direction. Now they are beginning to see that they cannot be satisfied with such a condition and are giving some attention to the roads from town to town. They can no longer look on a bad spot in the road with equanimity simply because it is five miles outside of town and no one ever goes out that far. They are beginning to realize the importance of having a good highway all the way to the next town. Last but not least, their local pride has been aroused and they are not going to let it be published to the world that the roads in their county are far inferior to the roads in a rival and nearby county.

One of the results of the trip of the good road scouts has been to inaugurate a strong movement to build a good highway between Richmond and Washington. The leading citizens and commercial bodies of both Washington and Richmond have entered into hearty co-operation and it is a safe prediction that before another year has elapsed the road between the two cities will no longer be the disgrace to the Commonwealth of Virginia which it is to-day. The direct road between those cities is known as the old "Telegraph road" and was described by "Pathfinder" in THE AUTOMOBILE of April 22. The scouts heard such discouraging reports of the condition of this road that they essayed a longer route via Gordonsville and Warrenton, but it is doubtful if the condition of this road is enough better to compensate for its forty miles of extra length. The direct road from Baltimore to Philadelphia was followed, crossing the Susquehanna river on the ferry at Havre de Grace. A vast amount of misinformation exists regarding this road. A number of years ago this road was reported to be almost impassable, and this information has been so widely disseminated that most tourists going from Philadelphia to Baltimore take a long, indirect route via York and Westminster. As the writer pointed out in the article above alluded to, no one need have any hesitation in going via the Havre de Grace route.

The good roads scouts ended their northward trip at New York on June 26 and were welcomed in behalf of the city by Acting-Mayor McGowan. Their work, however, is by no means completed, as there is still another route to be tried out, that by way of the Shenandoah Valley, Bristol and Chattanooga, Tenn., and, at this writing, the pathfinding White Steamer, with its passengers, is on its way to Atlanta by this route.





Tells a Story

Farmers who aid

Tucker's Ferry over the Savannah.

Almost impossible at Camden S.C.

Escort from Richmond Va.

# SOUTH INTENDS TO HAVE GOOD ROADS

Photos. by Lazarnick

Near Southern Pines N.C.

Making Road to Pinehurst N.C.

Leonard Tuffts of Pinehurst N.C.

Georgia employs its Boarders.

In Covington Ga.

Lithonia Roads of Georgia.

Crossing the Susquehanna.

## EXTENSIVE PLANS FOR LOWELL AUTO CARNIVAL

**L**OWELL, MASS., July 19—Plans are being drawn up on an extensive scale for the Lowell automobile carnival during Labor Day Week. There will be "something doing" every day from Monday, September 6, till Friday, September 10, and that something will include three days of automobile racing on the Merrimac Valley circuit, a day of motor boat racing on the Merrimac River, alongside the course, and a day of motorcycle events on the automobile circuit. There will be also, perhaps, a balloon ascension or other aeronautic stunt on the side.

For Monday, which is Labor Day and a holiday, the event is the automobile races for cars in classes 2, 3 and 4 under the A. A. A. piston displacement classification. The class 2 event (301 to 450 cubic inches piston displacement and 2,100 pounds minimum weight) will be over 20 laps of the course, or 212 miles; the class 3 event (231 to 300 cubic inches, 1800 pounds) will be over 15 laps, or 159 miles, while the smallest cars, class 4 (161 to 230 cubic inches, 1,500 pounds) will cover 12 laps, or 127.2 miles. The races will be started at 10 a. m. There will be trophies in each class, as well as cash prizes for the successful drivers.

### MAY OPEN QUAKER RACE TO FOREIGNERS

**PHILADELPHIA**, July 19—Although the Contest Committee of the Quaker City Motor Club has hinted at a possible opening of the entry list to foreigners for next October's 200-mile stock chassis Fairmount Park race, it seems hardly likely that there will be room for all the American makers who expect to enter cars in what will be the biggest event of the year in the East. Some of those concerns who have asked for entry blanks are talking of putting in two, and, in one case at least, three cars each. At this rate the limit of 20, beyond which the promoters cannot go by reason of the comparatively short course—a trifle under eight miles—will be reached long before the date for declaring the entry list closed.

There is quite a difference of opinion existing among the Quakers as to the effect the Contest Committee's recent letter to the American makers may have had. Some of them fear that the exclusion of foreign cars may give the public an idea of the possibility of the existence somewhere of a streak of yellow, that the opening of the list to foreign cars means a foreign victory, and that that is to be avoided above all things. The opinion is held by not a few of the committee that the admission of all the foreigners who care to enter should be welcomed on the ground that a victory will be all the more creditable to an American car under the circumstances. Those who follow the racing game closely are of the opinion that in a stock chassis event American makers have now nothing to fear from their foreign rivals, whatever may have been the situation a few short years ago.

The Quaker committee had a party of city officials out over the course last Wednesday, suggesting where improvements could be made. There are one or two short stretches where a car coming up from the rear would have to encounter some rather soft going in getting around. The officials promised that these portions would be macadamized to triple their present width long before the date of the race.

### F. I. A. T. TO HAVE AMERICAN FACTORY

Many rumors have been spread that the F. I. A. T. Company was to build a factory in this country, but the first authoritative statement to that effect has just been made public. The factory is to be located at Poughkeepsie, N. Y., where the company has acquired nearly thirty acres of land. The site has the advantage of a private dock in the Hudson River and connection with the New York Central Railroad. Albert E. Schaaf will manage the new factory. Although there has been much delay, it is hoped that operations will begin by the end of the year.

A series of dash races on the straightaway, a part of the circuit in front of the grandstand, is being arranged for Tuesday. The course is one of the best that could be asked, the surface being as smooth as asphalt and the roadway straight and wide. The trials will be mostly at a mile, with flying start.

Wednesday has been set apart for the National stock chassis race, to which President Taft has been invited. This will be for class 1 cars under the A. A. A. classification, namely 451 to 600 cubic inches piston displacement and 2,400 pounds minimum weight. The race will be over 30 laps, 318 miles. Motor boat racing has been assigned for Thursday, and an excellent course is available. Friday the American Federation of Motor Cyclists will hold sway.

President John O. Heinze of the Lowell Automobile Club returned a few days ago from a tour in New York and the West in the interests of the carnival, for the double purpose of ascertaining the feeling of the makers and dealers toward the proposed races and of conferring with the A. A. A. officials concerning some of the details. In both of these he was most successful.

### NEW PROGRAM FOR ALGONQUIN CLIMB

**CHICAGO**, July 19—There has been a revision of the program of the Chicago Motor Club for its annual hill-climb at Algonquin, Ill., August 5, and instead of classifying by piston area as has been done for the past three years the A. A. A. classification scheme will be followed, both piston displacement and price classification being used. In addition to the usual A. A. A. events the Chicago Motor Club has been given permission to add climbs for motor buggies and electrics, which are not provided for in the A. A. A. card. The revised card is as follows:

**Class A**, open to any stock car fully equipped and governed by the following prices. Winner to be the car making the fastest aggregate time for both hills: Division 1, \$4,000 and over; division 2, \$3,001 to \$4,000; division 3, \$2,001 to \$3,000; division 4, \$1,251 to \$2,000; division 5, \$851 to \$1,250; division 6, \$850 and under. No car shall compete in any division above that to which its price entitles it.

**Class A2**, same as class A except that the winner will be determined by the club formula.

**Class B**, open to any stock chassis (A. A. A. rules) and governed by the following table of piston displacement and minimum weights. Winner to be decided by time only.

	Piston Displacement	Weight
Division 1.....	451 to 600 cubic inches.....	2,400 pounds
Division 2.....	301 to 450 cubic inches.....	2,100 pounds
Division 3.....	231 to 300 cubic inches.....	1,800 pounds
Division 4.....	161 to 230 cubic inches.....	1,500 pounds
Division 5.....	160 cubic inches and under....	1,200 pounds

No car shall compete in any division above that to which its weight entitles it.

**Class C**, open to any chassis made by a factory which has produced fifty cars, not necessarily of the same model, during the twelve months prior to the event, winner to be decided by time only.

**Class F**, the same as class C, but having the following limitations as to size: Division 1, for cars having a total piston displacement not to exceed 390 cubic inches; division 2, for cars having a total piston displacement not to exceed 202 cubic inches. Time to decide the winner.

**Class C**, division 1, open to motor buggies, wheels 36 inches in diameter or over, with solid tires; division 2, open to electric. Time only to decide the two divisions.

### MAXWELL TRANSCONTINENTAL IN WYOMING

Mrs. John R. Ramsey, of Hackensack, N. J., who is driving a Maxwell car on a transcontinental trip from New York to San Francisco, has reached Granger, Wyoming, breaking all women's touring records. She is accompanied by Mrs. N. R. Powell, Mrs. Atwood and Miss Jahns. The party has met with bad weather all the way from New York, and in the West the roads have been in a condition the like of which is not remembered even by the oldest inhabitant. Long detours were necessary to avoid washed-out bridges, and at some of the fords which had to be crossed the water came in over the footboards of the car. Horses were found necessary on several occasions. However, the car is still in condition, and Mrs. Ramsey expects to complete the trip.



# Functions and Frailties of Motor Cylinders

BY THOS. J. FAY

IN using automobile gasoline for fuel, the thickness of cylinder walls is almost independent of bore, and the foundry possibility seems to be the ruling consideration. Measurements of a considerable number of motor cylinders of various bores, ranging between 100 and 170 millimeters, disclosed wall thicknesses of six millimeters ( $6 \div 25.4 = 0.239$ ").

A formula devised for the purpose of determining the required wall thickness reads as follows:

When,

$P$  = maximum pressure in pounds per square inch.

$d$  = diameter of bore of cylinder, in inches.

$t$  = thickness of wall of cylinder, in inches.

$k$  = a constant, representing an allowance for reboring, then

$$t = \frac{P \times d}{7,200} + k$$

The above formula is on a basis of 18,000 pounds per square inch, minimum tensile strength of gray cast iron, with a working strain of 3,600 pounds per square inch, making the factor of safety, after the cylinder has been rebored.

$$f = \frac{18,000}{3,600} = 5, \text{ after reboring.}$$

Excepting in racing car motor work, the pressure may be taken at 300 pounds per square inch, and even less in some cases involving rather low compression. Numerical examples involving extremes of cylinders, as respects bore, will afford an insight into the scope and utility of the formula, as follows:

For a cylinder with a bore of six inches, which is about as large as they are made in general practice, the formula demands, for the thickness of cylinder walls, the following:

$$t = \frac{300 \times 6}{7,200} + 0.0125 = 0.2625 \text{ inches.}$$

In order to be able to judge of the competence of the formula another example, using a smaller cylinder is given as follows:

For a cylinder of four-inch bore:

$$t = \frac{300 \times 4}{7,200} + 0.0125 = 0.1775 \text{ inches.}$$

Since the water-jacket walls do not have to sustain under a pressure of moment, it is at once a foundry problem, the question of the thickness of the walls. In continental practice, in view of the desirability of symmetry in thicknesses of walls, the jacket walls are made one millimeter thinner. The problem may be solved, affording all the protection that the occasion requires, if the jacket walls are made 0.0125 inch less in thickness than the thickness of cylinder walls as found by formula.

**Effect of Sharp Corners of Cores**—Fig. 25, showing vertical sections through moulds of two cylinders, one of an L, and the other of a T type of cylinder, indicates the contour of the walls of the cylinders by white, and the cores in black, with the moulding sand rammed around the exterior, as shown by cross-hatching. The parting line is indicated, and the cores are shown at their extremities tapered off to fit in bearings so as to be self-centering. Loose pieces for the bosses of the valve-stem guide are shown, and the cores, at several points, are indicated with sharp edges, thus rendering the castings defective, since strength depends upon a uniform thickness of walls, and the entire absence of abrupt turns. As a general rule it is due to defects such as these, and misplaced cores, that cylinders are found wanting in service; true, the necessity for good material must not be overlooked, but it is not, as a rule, a question of mathematical proportioning that results in inferior work; it is rather a matter that rests with the foundry, as disclosed in Fig. 25.

Pistons are made of the same material as cylinders and experience seems to indicate that the bearing surfaces afforded are better than when steel pistons are used in cast-iron cylinders, or when steel cylinders are made to serve with pistons of either steel or cast iron. Fig. 26 shows the several shapes of piston heads in vogue, and A is of a flat head, of least ability from the strength point of view; B indicates the usual elliptic formation

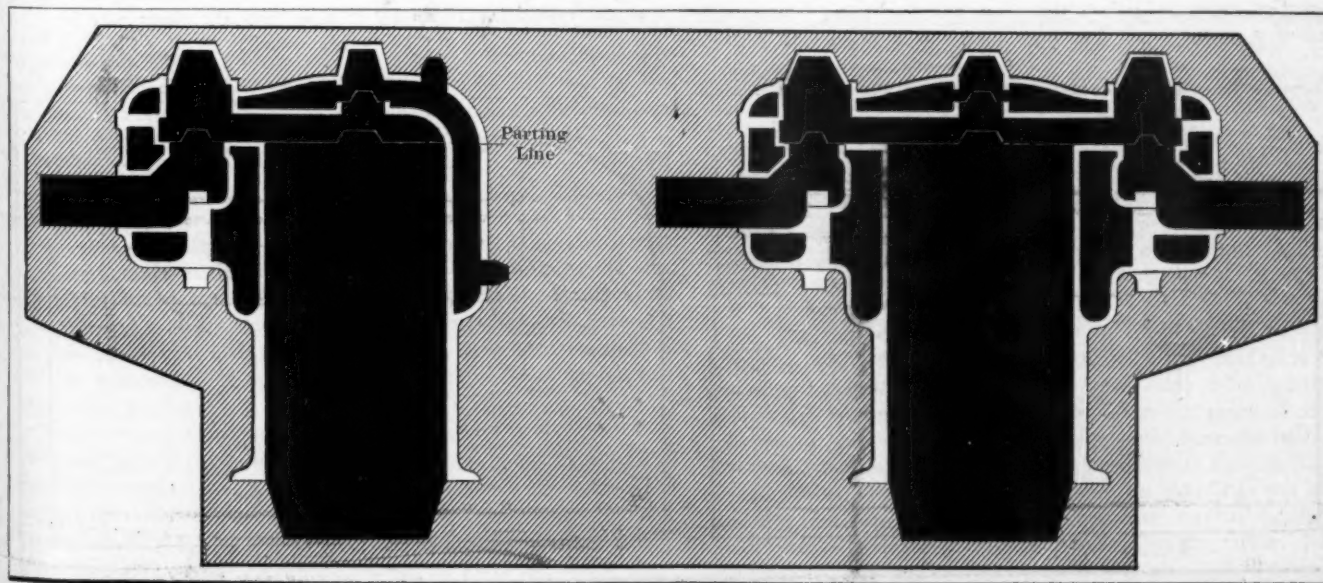


Fig. 25—Illustrating defective moulding preparation, resulting in sharp corners in the metal of the walls of the cylinders

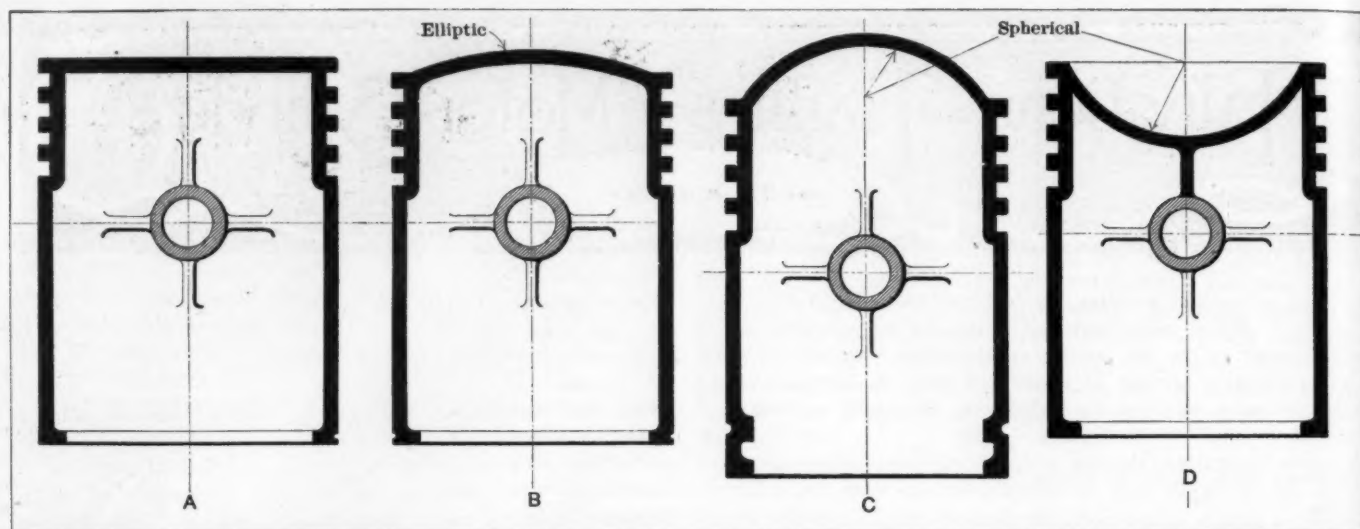


Fig. 26—Depicting the several forms of piston heads in vogue and showing the customary number of rings used

which has the merit of great strength at the junction of the head with the barrel, and lightness on the whole, so that the total weight of the reciprocating mass will be on a minimum basis if the connecting rod is suitably devised. C shows a spherical head sometimes used, and in high compression motors it has the advantage of displacing compression chamber volume and the strength of the head is maximum. D is of an inverted spherical head suitable for use on motors with a low compression, especially in the class that do not run at a very high speed, for, like C, the head is somewhat heavier than the weight attending the use of the elliptic shape as shown at B.

**Influence of Ribbing on Strength and Shape**—Expansion, following changes in temperature, will be uniform in a piston of symmetrical shape with uniform thickness of the walls, if the metal used is of even texture. If the ribbing is as depicted in A, Fig. 27, the expansion will not be uniform, since the ribbing is in one plane, at right angles to the axis of the piston pin; this scheme is also defective because the rib, so placed, does not lend support to the bosses in which the pin is held. B indicates ribs in two planes, so contrived that the pin supports are ribbed, and in this case the ribs are deeper in the axle plane of the pin, so placed to afford additional strength. The disadvantage of this plan lies in the difference in expansion that will follow the use of ribs of differing depth. C represents a system of ribbing that offers a more even distribution of the work, and the results in practice, from the use of this plan, are very good. When the speed of a motor is so very high that it is necessary to restrict

the weight of the piston, the scheme as shown at D is substituted for that of C, and three rings are used instead of four. In all cases excepting at D the bottom of the piston is provided with an inward projection flange to add strength and rigidity to the whole; it is probably not necessary to thus add weight, and in practice it is found that pistons are satisfactory without this addition. In a few notable instances the walls of the pistons were drilled quite full of rather large holes to reduce weight, and the plan offers the desired advantage at an additional cost of construction.

Since pistons are not jacketed for water, or other cooling solutions, they are likely to prove troublesome, due to over-heating, especially in case there is any protruding part above the head in contact with the heated products of combustion, as when bolting, the heads of the bolts project into the combustion chamber. As a rule it is considered better to have the head perfectly smooth all over the exterior, which will be true when the pistons are machined all over. That the head may be very thin is true provided the walls are thickened as they approach the barrel. Oil-grooves are usually placed at advantageous points, as shown at B and C, Fig. 26, and that they aid in distributing the oil seems to be true. In some cases a ring is placed near the bottom of the piston for the same purpose, offering the further advantage of rendering the piston more tight against compression. Lubrication has a wide influence on the question of tightness, no matter how the cylinders are made, or how tight the rings may be.

(To be continued.)

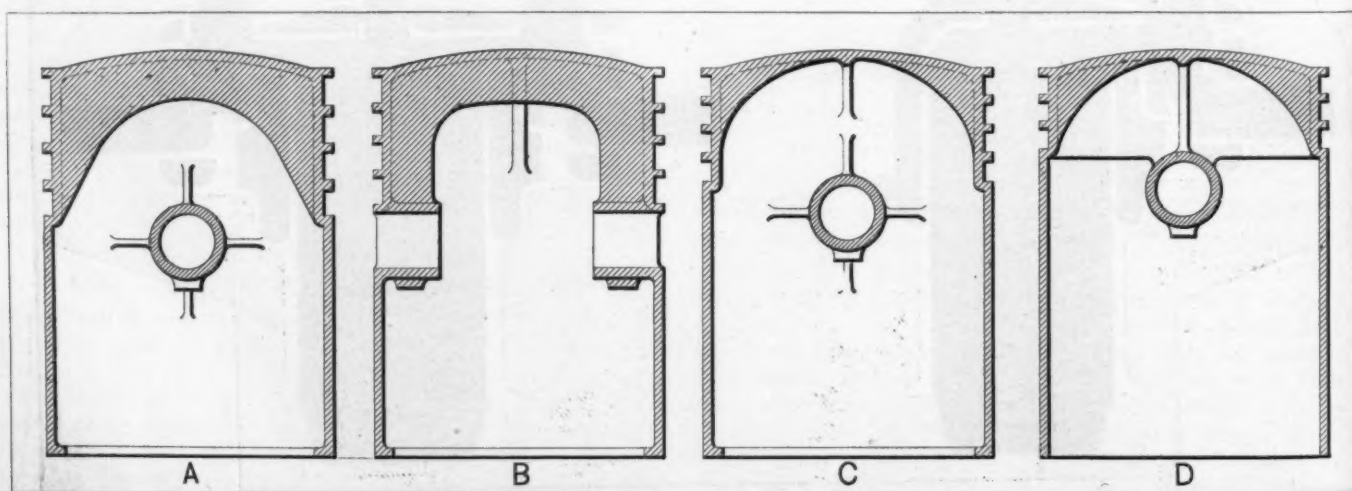


Fig. 27—Sections, showing the plans of ribbing used, and the several ways of sustaining the piston pin supports



## FLEXIBILITY DESIRABLE IN AUTOMOBILE MOTORS\*

By E. GIRARDAULT.

THAT quality of the internal combustion motor usually referred to as "flexibility" conveys to the mind of the average autoist but a vague idea of what is really meant. Study of a number of tests has led us to attempt to formulate a number of the more important factors bearing upon this quality in a manner that should be of interest to the automobilist. This has been carried out with the aid of M. J. Bethenot, a well-known electrical engineer. We will make the results of this investigation plain here, accompanying it with elementary demonstrations, from which there have been eliminated as far as possible mathematical formulæ and the jargon of the mechanic. It will also be possible to realize from this the influence that the matter of flexibility in the motor should have on the design of the car, and particularly on the change speed gear.

It is a matter of common knowledge that the power of the explosion motor varies according to the speed at which it runs. The same motor will give a maximum of 10 horsepower at 600 revolutions, for example, and 16 horsepower at 1,200 r.p.m. If there are marked off on a straight horizontal line *Om*, points denoting the number of turns of the motor per minute, and each point thus obtained, a vertical line is raised, across which at proportional heights lines representing the increasing horsepower are drawn (measured experimentally with the brake), points such as T, A, M, etc., which indicate the horsepower of the motor, are obtained. Joining these points with a line, a curve is obtained representing the variation in the power with differences of speed.

At the same time as the power curve is traced—that is, the work done by the motor per second—we may also outline the curve of the couple; in other words, the energy delivered by the motor at each turn. The second curve may be traced point by point, from the first, the energy per turn being deduced from that per second by means of the rule of three, since the number of turns per minute is known. Experience has demonstrated that the two curves in question take the form shown in the accompanying diagram of flexibility.

There may also be deduced from the power curve the curve of the couples without the necessity of calculating the couple for each point by proportion. Let us join the point M by a line with any one of the power indications having their origin at O. The triangle OMM will give us the formula:

$$tg \alpha = \frac{Mm}{Oo} \dots \dots \dots (1)$$

*Mm* represents the power of the motor at the speed of rotation measured by *Om*. Now the quotient of the power by the number of turns per second is exactly equal to the couple; that is, *tg α* represents the motor couple. The couples may then be measured on the diagram by the segment *uv*.

By dropping a perpendicular from M until it meets a line extended horizontally from *v*, the point *n* is obtained, indicative of the couple represented by the conditions *Om*.

It may be remarked that the maximum couple is obtained when *α* is highest; that is, when the straight line joining O and M is elevated as much as possible, since then it is tangent to the power curve, and by this means it will be easy to recognize conditions under which the motor will be in danger of stalling. It will be apparent that this is knowledge which should be interesting to the purchaser.

The curve of the couples indicates that the maximum is at C, the point where the tangent is horizontal, while the power curve has its maximum at A. In the case of the motor from which the curves here illustrated were taken the maximum couple was registered at 400 r.p.m., while the maximum power was delivered at close to 1,000 r.p.m. To generalize, we will designate by *n* the

conditions corresponding to the maximum couple, and by *N* normal conditions, under which the maximum power is developed.

Inasmuch as the resistance offered the motor is constant and the conditions of running are equally so, the motor continues to operate practically the same. This is the case of an automobile motor with a steady, harmonious exhaust. As soon as the car begins to mount a hill the motor cannot continue to advance the vehicle at the same speed, and it slows down; as its r.p.m. rate falls off, the power decreases correspondingly. Let us consider the curve of the couples. Since the motor is at a point superior to *n* turns (on the diagram 400 r.p.m.), there is no fear of stalling, because the effort produced by each turn becomes greater as the motor slows down. We have already said that between *n* and *N* the motor is in its zone of stability; that is, the zone in which the motor will not stall. But it may be that its speed will be retarded to a point below that of *n* turns. Then it will not be capable of producing sufficient power at each revolution to carry the load imposed by the grade. The motor will be stopped unless

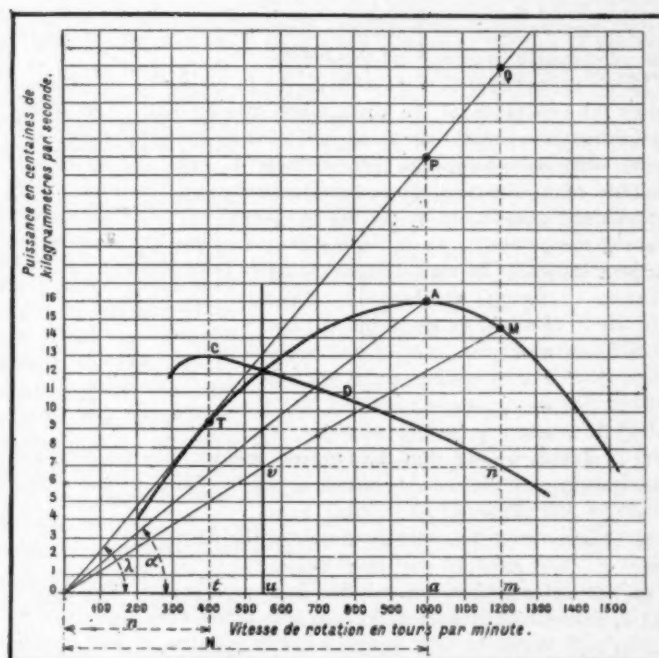


Diagram Representing the Flexibility of a Motor

Vitesse de rotation en tours par minute = speed in revolutions per minute. Puissance en centaines de kilogrammètres par seconde = force in hundreds of kilogrammeters per second = force in units of 13.83 foot-pounds per second.

recourse is had to a change in the gear ratio between it and the driving wheels. This elementary reasoning is evidently applicable to the condition attendant upon the change of gear. The lack of flexibility of the automobile motor makes it imperative to be able to vary the gear ratio of the transmission is the way this is commonly stated.

We have observed that the change of speed should be made at the point where the speed threatens to fall below that of *n* of the maximum couple. Once the lower gear ratio is in action, the motor will resume its normal speed. From the point of view of efficiency it will evidently be advantageous to have the motor run continuously under conditions which permit it to develop its maximum power. But we will see further on that it is not always possible to design a change of speed gear-set so that the different steps may be effected at the normal speed of the motor. But for the moment we will assume that this is the case, subsequently modifying the simple conclusions which this hypothesis furnishes.

Briefly, the motor oscillates between the two extreme condi-

\* Translation from the French of "Omnia," by Charles B. Hayward.

tions,  $n$  and  $N$ . Being at the point  $n$ , which gives the couple  $C$ , we pass with the aid of the change speed lever to the point  $N$ , which gives the couple  $c$ . The relations between the corresponding steps in the gear-set are evidently equal to the relations

between the couples —, since this is also the ratio between the effort required per turn of the wheels at the different speeds.

If we substitute for the couples their values in functions of the power and the speed we obtain for the constant ratio  $s$  of the steps (also termed the speed ratios):

$$S = \frac{N w}{n W} \dots\dots\dots (2)$$

in which  $N$  is the number of turns at normal speed, giving the maximum power.

$W$  is the maximum power.

$n$ , speed at which maximum couple is produced.

$w$ , power corresponding to the speed at which the maximum couple is produced.

The constant ratio, which theoretically is that of the two successive speeds, measures the flexibility of the motor.

The speeds provided by the gear-set are, assuming  $v_1$  to be the first:  $v_1 \times s \times v_1 \times s \times s \times v_1 \times s \times s$ .

In other words,  $s$ , the flexibility of the motor, is the reason for the geometric progression of the speeds.

However, the speeds will no longer be in geometric progression when the resistance of the air is taken into account. The higher speeds must be lower than those indicated by the progression.

We will also show that the flexibility as thus defined is susceptible of a very simple geometric calculation, and that  $s$  may be obtained graphically by tracing the power curve of the motor. Taking the power curve and the point of origin,  $O$ , produce the tangent shown. The right angled triangles  $OPa$  and  $OTt$  give:

$$\begin{aligned} Pa &= Oatg\lambda \\ Aa &= Oatga \dots\dots\dots (3) \end{aligned}$$

From which:

$$\frac{Pa}{Aa} = \frac{tg\lambda}{tga} \dots\dots\dots (4)$$

It is already known that the tangents measure the couples, and that the ratio of the couples measures the flexibility of the motor.

$\frac{Pa}{Aa}$

The equation — accordingly measures the flexibility.

$\frac{Pa}{Aa}$

It will be seen that this relation is always greater than unity, but in automobile motors it exceeds that figure very slightly, i. e., 1.2 to 1.5. With the first figure, 1.2, for instance, it will be evident that a great many steps would be required in the change speed gear if the conditions we have outlined are to be met. But in practice, recourse is had to an artifice for taking care of the lack of flexibility in the explosion motor; at the moment that the speed of the car is to be changed the motor is speeded up.

The following shows how this well-known custom of the chauffeur may be rationally justified. Our figures give the explanation sought. It is, in fact, that the condition  $Om$ , superior to  $N$ , is attained by the motor when it is speeded. If the gears then be shifted the relation  $s$  of the two consecutive speeds is represented on the diagram by —.

$\frac{Qm}{Mm}$

It will be seen that this ratio

increases very rapidly as the motor drops from normal. It may be said that this ratio represents the flexibility of the condition  $Om$ , and defines the flexibility at any given speed.

But in running the motor above its normal speed at the moment of gear shifting, the flexibility is increased at the sacrifice of efficiency and the life of the mechanism, this being necessary to avoid having to employ too many gears in the transmission. But, naturally, those motors which require the minimum of speeding will be preferred; that is, those possessed of the greatest factor of flexibility at normal speed. The ideal would be to obtain a

motor having a coefficient of flexibility of at least 1.6 at its normal speed, which would eliminate the necessity of racing.

From this it may be appreciated that the coefficient of flexibility, of which the expression and geometric demonstration are so simple, is a very important characteristic of a motor, and that builders should give it quite as much as they do the consumption per horsepower hour of their motors, since it is intimately related with the necessity for using the gears—an enormous source of expense in cabs and autobuses.

Another result of the foregoing investigations is to bring forward very prominently the advantages of a four-speed gear over one having but three steps, from the point of view of fuel consumption and life of the motor, for the more speeds there are and the less the speed of the motor has to be varied the less necessity will there be for handling the change speed lever. This advantage disappears, however, with a motor sufficiently flexible to make gear changing possible at the normal speed of the motor.

To increase the flexibility, devices designed to regulate the carburetion in proportion to the speed are commonly employed. These may be classed in two groups, those producing throttling at the higher speeds and those which impoverish the mixture as the speed increases. The first class is inferior in principle, because throttling lowers the degree of compression and in consequence the efficiency, while the employment of a poorer mixture tends to maintain this at the maximum. This expedient is not without its disadvantages, however, the first of which is the necessity for avoiding auto-ignition, since the compression employed at high speeds with a poor mixture must not be the same as that at low speed, when a rich mixture is necessary. Otherwise, auto-ignition is inevitable with the latter, from which there arises the necessity of throttling at the lower speeds.

To sum up, it always ends by arriving at a point where the efficiency of any given motor must be sacrificed, but it will evidently be better to do this at speeds rarely employed than at the normal r.p.m. rate of the motor. This is because we are able to employ a system of carburetion which will reduce to a minimum the expense for fuel and gears—both items of considerable importance. One objection that may be urged against the use of poor mixtures at higher speeds is the low factor of power per weight thus obtained (*puissance massique*). We are, in fact, compelled to employ motors which produce all the power of which they are capable under normal conditions; that is, with normal mixtures, bore, volume and weight being considered. Is that a great drawback? We hardly think so, especially for industrial vehicles. It is interesting to note how little power per unit of weight may be employed, and how great the total weight may be raised, but within certain limits there should be no fear of employing somewhat heavy and relatively slow motors of great capacity, with the compression as high as possible and employing fuel mixtures which become poorer as the speed increases. This, of course, for the autobus and the truck.

To make a résumé, it will be seen that studying the question of flexibility has led us to considerations of other parts of the vehicle, and particularly the choice of the motor, construction of the change-speed gear and the regulation of the carburetion. Advantage has been taken of the foregoing in the touring car, and builders have been asked to reduce the horsepower to one-fourth of what it is. It may not be beside the point to remark that foreign engineers head the commercial vehicle industry, because they do not build their cars on sentiment, but according to the needs of economic exploitation, which involves mechanical problems that must be solved.

**Removing Foreign Substances from Cylinder**—Sometimes a foreign substance, such as a piece of porcelain from the spark plug, the key of an automatic inlet valve, or a small washer, falls into the cylinder. Such substances can be easily expelled by removing the exhaust-valve cap and turning the motor over by means of a starting crank, when the fragment will be shot out into the air, very quickly.



## LETTERS INTERESTING AND INSTRUCTIVE

### USE OF CASTOR OIL

Editor THE AUTOMOBILE:

[1,948]—To settle an argument, will you kindly answer the following question: Is it not only possible, but also good practice, to use the best grade of castor oil for lubricating a high-speed engine, at, say, 1,000 r.p.m.? By this is meant a gasoline engine such as is used in automobiles.  
Lebanon, Pa. C. L. WEIMER.

Yes, it is not only possible to use castor oil as a lubricant for automobile engines, but is also representative of the best practice. In fact, it is more than that—it represents the very highest practice, being used upon racing machines, where ordinary lubricants would not answer. Particularly is this true of very high compression motors in which the pistons and piston rings must be an unusually tight fit in the cylinders. For these, castor oil is the only thing that will serve the purpose. Its universal use is very limited because of the price, which is far beyond that which ordinary motorists are able to pay. There are several cars built in this country the makers of which advocate the use of nothing but castor oil for the cylinders, although other oil may be used elsewhere on the machine.

### OFFSET CRANKSHAFT

Editor THE AUTOMOBILE:

[1,949]—Please set forth in "Letters Interesting and Instructive" the advantages of an offset crankshaft; also, of a long stroke motor; that is, small bore and comparatively long stroke. R. N. HICKMAN.  
Cleveland, Ohio.

The principal advantage claimed for the offset crankshaft construction is the elimination of the side thrust of the piston on the cylinder walls, during the power stroke. By eliminating this, it is possible to increase the power from the same sized cylinders and at the same speed. The disadvantage to which the most weight is attached is just the reverse of this; the side thrust on the return or compression stroke is increased over what it would be on an engine with shaft set central. The amount of the off-set differs with different cars. The usual range is from one-quarter inch to an inch and a quarter, but a formula for it has been advanced. This, which was given much discussion about a year ago, was one-fifth of the stroke for the amount of the off-set. So, with a 5-inch stroke, the off-set would be one inch.

This formula does not hold, however, to any extent, as the few users of off-set shafts do not agree on the subject, some advocating more off-set up to one-quarter of the stroke, and others advising the use of less, even down to one-eighth of the stroke. The fact remains that it is not or should not be an arbitrary constant quantity like that, but should be proportioned to the other parts of the engine. Thus, with a very short stroke motor, in which

short connecting rods are used, a large off-set would be more desirable than in the case of a long stroke motor with long connecting rods.

Much discussion has attended the attempt to determine the superior length of stroke. Prominent French makers not only advocated but adopted the longer stroke. English makers, on the other hand, were more given to short strokes, and still stick to them. It remained for the races in which an unlimited length of stroke was allowed to prove the point to the satisfaction of all—French, German, English and American. Thus, in the English Four-Inch race the bore was limited to four inches, but the stroke was unlimited. The result was that several machines were constructed with abnormal strokes which were able to deliver on the testing block as high as 71 horsepower. So, too, in the more important Continental contests the stroke has been unlimited, with the result that a series of abnormal racing motors has been developed, many of them having a stroke twice the bore.

At any rate, it has been proven that both more power and greater speed may be obtained with very long strokes—this, too, on racing motors, which are nothing if not light in weight. So, one of the most weighty arguments against the long stroke was laid to rest by this experience. It is argued in its favor that by allowing more time for each of the cycles they are more complete, and consequently more perfect. Take the exhaust stroke, for instance: this has a much greater length of time in which to take place, and is more effectually carried out. Similarly with other functions.

It is argued also that with slower engine speed less reduction is necessary between the motor and the road wheels, resulting in a less amount of gearing, and consequently a lessened number of control rods and levers, all of which adds to the so-desirable simplification of the automobile.

Without desiring to go into this matter to any greater extent here, the reader should know that this does not by any means cover the subject. Those interested in pursuing the matter further are referred to the following articles which have appeared in the columns of THE AUTOMOBILE recently:

August 27 issue, 1908, pages 293 to 295.

September 17, 1908, pages 397 to 398.

September 17, 1908, issue, an additional article on page 398.

December 24, 1908, issue, page 897.

The matter of offset crankshafts was gone into very thoroughly under "Letters" in the May 20 issue, THE AUTOMOBILE.

### ABOUT HIGH ALTITUDES

Editor THE AUTOMOBILE:

[1,950]—My attention has been called to several unusual problems in automobile work and I take the liberty of asking you to give me your opinion on same. Also, please inform me if you have ever published any answers to the following questions, and when:

Question A—Suppose I toured through the West in my car, built by an Eastern builder, and during my trip I arrived at the city of Denver. The altitude of Denver is, I believe, about 5,000 feet above the sea level.

First—What effect would the lessened atmospheric pressure have on the carburetor's action? Could I remedy same, and how?

Second—Would the lessened pressure effect to any noticeable extent the work of the gas mixture in the cylinders?

Third—Would the explosive pressure be less by reason of the air being lighter and having a correspondingly smaller amount of oxygen per cubic foot?

Fourth—Would not the water, by reason of its lower boiling point at this altitude, permit the cylinders to become dangerously warm?

Question B—What arguments are advanced for or against the use of sub-frames upon which to place or suspend the power plant—that is, the motor and transmission gear?

Elyria, O.

In reply to the first paragraph of question A, the lessened atmospheric pressure would lower the gasoline level in the float chamber relative to what it is at present in a lower place. To remedy this, lower the nozzle, which will raise the level of the liquid, lowering it enough to compensate for the difference in pressure of the present place and Denver, one mile up. Similarly, the air there is thinner and more rarefied, so a greater amount of it will be needed to vaporize the same amount of fuel. To remedy this it will be necessary to open up the auxiliary air inlet, so that more air may enter, accomplishing this according to the construction of your carburetor. It might seem like needless work to make the two alterations to the carburetor—raising the spray level and allowing more air to enter, when a person might think that the lower level would require less air—so the same result would be accomplished by leaving both as they are at present. However, this supposition is contrary to fact, for the engine needs just as much fuel, which can not flow if the level in the float chamber is reduced. Therefore, you must alter the position of the spray nozzle. If this is done, it will also be necessary to alter the air supply.

Second paragraph: No.

Third paragraph: Yes; if no changes are made in the carburetor adjustments. No; if the changes are made as indicated above.

Fourth paragraph: Yes; this will have a marked influence, and more care will have to be used in running the engine so as to heat the water as little as possible. Similarly, more care will have to be exercised in filling the radiator, which should be filled oftener—that is, kept filled more carefully than is the usual case.

Question B—There are two reasons which are ordinarily advanced against the use of sub-frames, differing widely. One is a constructive reason, cross members and sub-frames cost more than extended arms on crankcase and gearcase and also cost more to put into place. By increasing the number of joints in the suspension, the number of sources of trouble is also increased. The other reason is one of principle, the opponents of the use of sub-frames saying that it makes too rigid a frame construction, so that the inequalities of the road are transmitted to the crankcase and gearcase; thus rough roads are very liable to cause a fracture of the arms of one or both, through no fault of their own, but simply from the fact of its being rigidly tied to the sub-frame. In three-point suspension, which has many adherents, the elimination of the sub-frame is practically necessary to the completion of the three-point construction—that is, the idea could not be carried out with a sub-frame.

In favor of the use of sub-frames, it is argued that it allows of the segregation of the power parts, as engine, transmission, clutch, etc., into a number of separate and distinct units, each complete in itself, machined, assembled, and repaired separately. With long arms on the crank and gearcase attaching them to the main frame, the important parts of the car's mechanism are supported on castings which are unreliable, whereas in the use of a sub-frame the very short, stiff, and strong arms are supported from a sub-frame of steel, so that the whole is more reliable.

### TO STOP THAT NOISE

Editor THE AUTOMOBILE:

[1,951]—Relative to the letter (1,926) of Don S. Numbers in the July 1 issue of "The Automobile," there are six blots that hold the brake drum to the rear wheels. By taking off the wheels it will be found that these strike the mechanism of the brake. Clipping off the ends with a chisel will cause the noise to disappear. I had the same trouble with my model 10 Buick and cured it in this way. N. S. HEGNES.  
Argyle, Minn.

By blots the writer of the above evidently meant bolts, the two letters having been transposed by accident. This remedy might be tried by Mr. Numbers, and if not successful doubtless other similar sources of trouble will present themselves later.

### ANOTHER VIEW OF IT

Editor THE AUTOMOBILE:

[1,952]—Inquirer 1,926 will undoubtedly find upon close examination that the light clanking noise in his Buick Model 10 comes from looseness of the emergency brake bands. These bands should have very little side play, else vibration will cause them to continuously tap the brake drum and thereby produce the light clanking noise spoken of. Upon removal of the wheel from the axle the proper remedy will be apparent.

Park River, N. D. F. J. PROCHASKA.

Since the above letter presents another view of the light, clanking noise trouble and a remedy for the same, it is given in full. Several other letters treating of this same trouble have been received and will be published in later issues.

### CARBURETER TROUBLE

Editor THE AUTOMOBILE.

[1,953]—Will you explain in "Letters Interesting and Instructive" what is wrong with a 1906 model Indian motorcycle? It starts hard and the primer has to be held down. Then it will run about 200 yards, when the primer has to be held down again. Sometimes even this remedy will fail. I have had the carbureter apart and it is in good shape and clean. The spark seems to be very good at all times.

Hazleton, Pa. SCHUYLER PARDEE.

Since your spark is good, the trouble must be in the fuel system. It appears from your description as if you were starving the engine, although doing so unconsciously. This starving action is due to the fact that the gasoline level has been lowered so far that the suction of the engine does not draw up sufficient fuel for running. The fact that you have to prime to start and then, prime to keep a going, even this priming failing to work sometimes, would seem to prove that the engine is not getting enough fuel. The trouble is that the spray nozzle has been raised too high, so that the gasoline level is four or five times as far below the nozzle as it should be.

The engine suction must raise the gasoline this distance before any of the fuel will get into the cylinder, and if the distance exceeds the height which the suction has ability to raise the fuel, none will pass over. In a case of this sort, priming only helps temporarily.

It might be of interest to you to refer to the answers to others who have had the same trouble, and particularly the ones which were illustrated, as the figures may help you out in your present dilemma and aid you in understanding our explanation. Letter 1876 in the May 13 issue of THE AUTOMOBILE discussed the effect of change of jet elevation. Then, in the June 17 issue under the heading of "Cause of a Bad Knock," this was enlarged upon and a figure shown, which illustrated the effect of a variation in the nozzle level. The latest "letter" on this subject is 1940, in the July 15 issue, just off the press, in which this subject is spoken of incidentally to a number of other troubles.

### WHERE FORT ANCIENT IS

Editor THE AUTOMOBILE:

[1,954]—In your issue of July 1 appears an article, "Climbing Fort Ancient Hill—41 Miles from Cincinnati." I take exception to the statement that it is directly east of Cincinnati on the C. H. & D. R. R. The fact is that it is located five miles east of Lebanon, O., the county seat of Warren county, on the Little Miami Railroad and the Little Miami River. Again, the writer of the article says that Fort Ancient will become "historical." The fact remains that it is historical since it is the fort built by the mound builders and is now owned by the State of Ohio and is being laid out as a State park to perpetuate as far as possible this natural fortress and the remaining earthworks built by this unknown people.

The nearest the C. H. & D. approaches Fort Ancient is 20 miles west. I made the climb a year ago and until recently resided in an adjoining county. My object in writing is that such a point as Fort Ancient should be properly located geographically.

Los Angeles, Cal. C. O. RICHTER.

Mr. Richter misunderstood the use of the future tense in connection with the statement, "Fort Ancient will become historical."

The idea to be conveyed by this remark was that the hill will become famous in connection with hill-climbing contests, just as Dead Horse, Giant's Despair, Fort George, and many other hills which doubtless were historical in so far as they were connected with incidents of American history, years and years before the automobile was ever dreamed of.

### WHAT TO DO ON WET PAVEMENT

Editor THE AUTOMOBILE:

[1,955]—Kindly advise me what to do when in driving an automobile on wet, slippery asphalt or wood pavement, the car skids and starts to whirl around. This is particularly liable to happen when an attempt is made to slow down or stop the car.

Westfield, Mass. H. P. MOSELEY.

There are two methods, both on the order of preventatives: equip your car with tires having a non-skid tread or use chains. If you do not care to do this, avoid wet or slippery pavement, just as you would mountains, rocky roads, or anything else dangerous. If it is absolutely necessary to drive over a slippery piece of pavement, start onto it and proceed across it, with a speed reduced as low as possible. When approaching such a piece of road retard spark, reduce throttle, and change down into a lower speed. The very erratic movement of a fast-moving car upon a slippery pavement, particularly, as you have remarked, when slowing down, has never been satisfactorily explained. At best, it represents a source of imminent danger and should be approached with much care and treated as such.

### CONTEST RULES UNJUST?

Editor THE AUTOMOBILE:

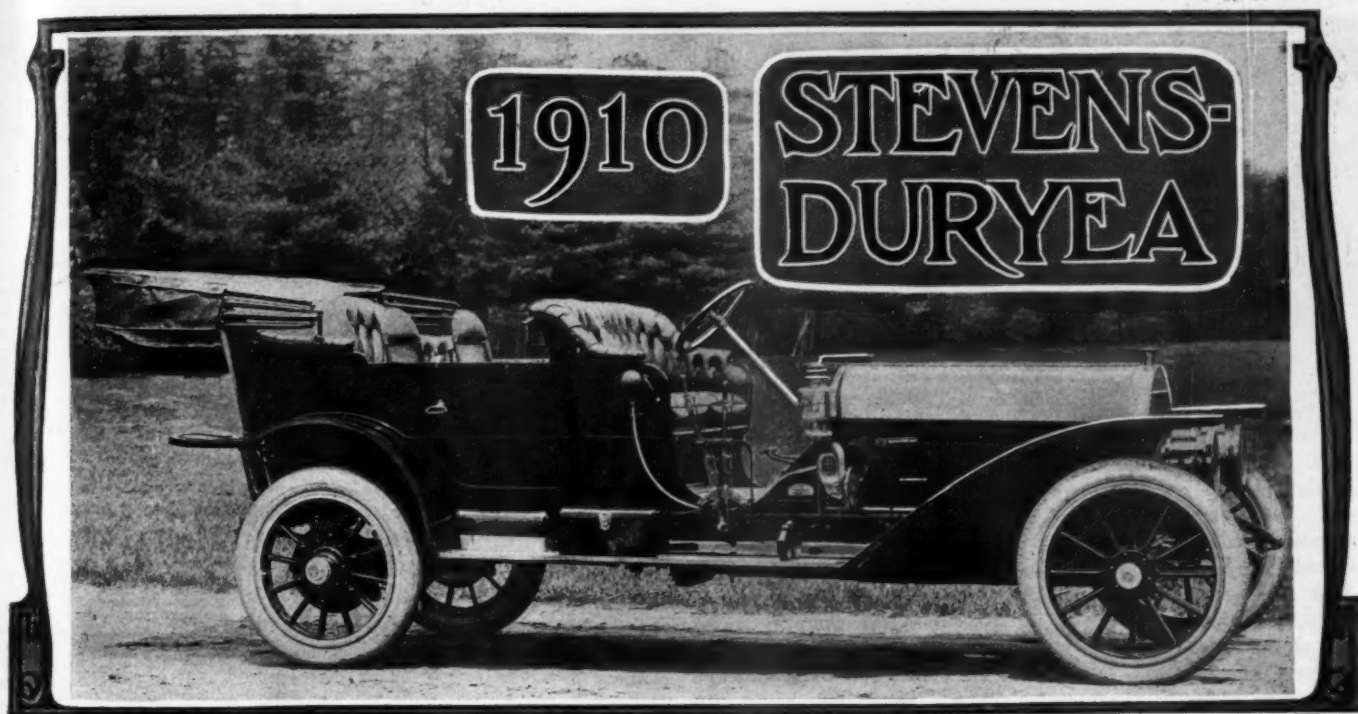
[1,956]—As manufacturers of light-weight cars we would like to make public protest in your reading columns against the rules laid down to govern the so-called "light car contests." At the present time in all the light car events for the next two or three months, where piston displacement is the basis of qualification, a minimum weight of chassis of 1,800 pounds is called for. What chance has a manufacturer, like ourselves, who does not build a car that weighs to exceed 1,700 pounds, to show his cars in competition? The ruling gives an unfair advantage to the builders of heavy cars with small motors, and leaves the light car manufacturer completely out in the cold.

Automobile racing is supposed to have its greatest value in assisting to determine the most defective and least practical design. If a manufacturer is able, as we claim we are, to build a 36-horsepower engine, place it in a car with a carrying capacity of five persons and show a total weight for car and equipment of less than 1,700 pounds, why should he not be permitted to demonstrate in important contests in competition with other manufacturers that his idea of construction and proportion of power to weight is superior? In other words, why should we not be allowed to take the chassis of our 1,675-pound five-passenger car and place it in competition with other cars of our same rated horsepower? In a race of 250 miles if light cars can stand the racket better than heavy ones, why should not the light ones get the credit, and vice versa?

We claim an advantage over the heavy car, and the heavy car manufacturers claim an advantage over the light. Why should we not be allowed to get together on the same footing and fight it out? All we want is a chance with cars of our same power, but at the present time the best we get is a chance to compete in free-for-all events with no limitations of any kind, which proves nothing of value to the builder and merely furnishes good sport for the spectators.

CAMERON CAR COMPANY,  
Beverly, Mass. H. W. DOHERTY.





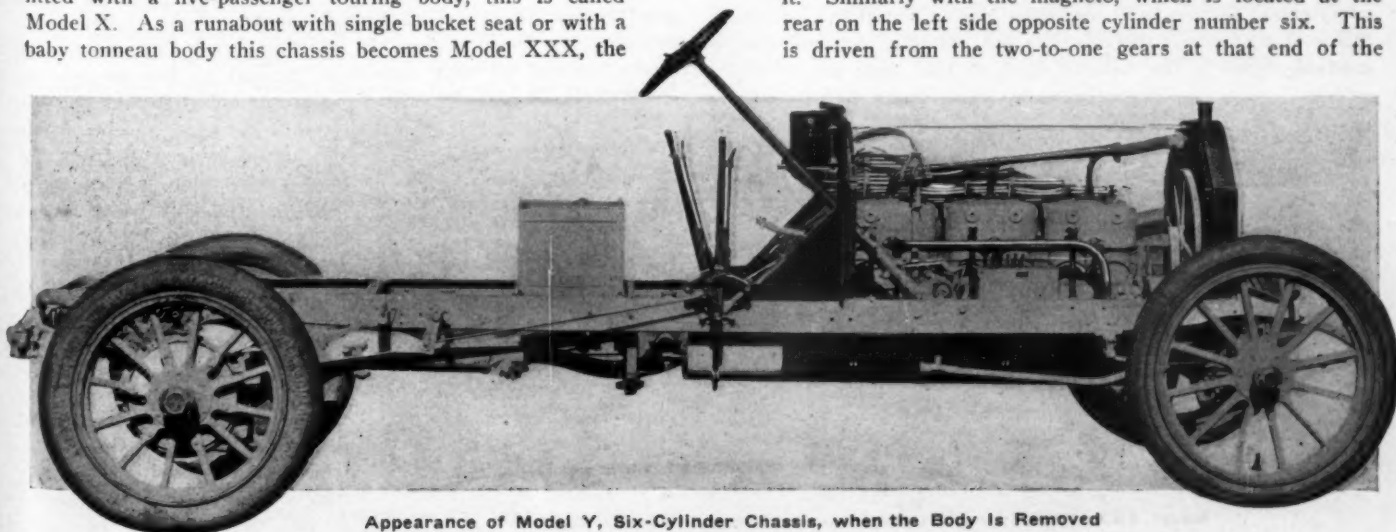
Big Six, the Stevens-Duryea Leader for 1910, a Forty-Horsepower Seven-Passenger Touring Car

OF long standing, but up to date, is the complicated and somewhat paradoxical phrase which describes the cars of the Stevens-Duryea Company, Chicopee Falls, Mass. Since 1905 this concern has been the steady and aggressive exponent of the six-cylinder engine for large powers, and the output for the coming year will contain an excellent example of this form of construction. In addition to this, the New England concern has advocated the unit power plant with three-point suspension ever since 1904, and the cars for the season of 1910 will all contain a power plant constructed along these lines. Such was the clarity of the original ideas in both that no changes have been made from that time to this, and as the present product shows, the construction has not been altered from the first car built.

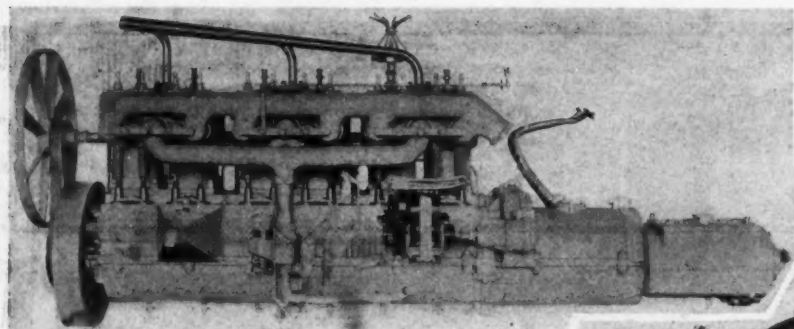
Next season's leader will be the old standby, Big Six, a six-cylinder forty-horsepower car called Model Y, with cylinders of  $4\frac{3}{4}$ -inch bore and  $4\frac{1}{2}$ -inch stroke. As a standard equipment this will have a roomy seven-passenger touring body. Then there will be two "fours," differing mainly in the bodies and the little changes that go with the different bodies. The motor is  $4\frac{3}{4}$ -inch bore and  $4\frac{1}{2}$ -inch stroke, rated at twenty-four horsepower. When fitted with a five-passenger touring body, this is called Model X. As a runabout with single bucket seat or with a baby tonneau body this chassis becomes Model XXX, the

power unit of Models X and XXX being identical. The former, however, has a 124-inch wheelbase and will take limousine or landaulet body interchangeably with the touring body. Model XXX, on the other hand, has a shorter wheelbase, 109 inches, and so will not take the enclosed type of body. Moreover, in keeping with the idea of a light, fast car, the springing has been altered, the rear springs on the X being platform, with 48-inch side members and 35-inch cross spring. On the XXX model this is changed to semi-elliptic, 56 inches long.

**Big Six Power Unit**—Model Y is powered with a six-cylinder engine of  $4\frac{3}{4}$ -inch bore by  $4\frac{1}{2}$ -inch stroke, rated at forty horsepower. The cylinders are cast in pairs, with integral water jackets and valves located all on the left side. The construction is so planned that nearly every part ordinarily removed may be taken off without disturbing the others. Thus, the exhaust pipe rises above the exhaust ports and passes across the upper part of the cylinder, while the inlet pipe drops down below the line of the openings, in this way making each pipe removable without disturbing the other. The carbureter is made integral with the lower part of the intake pipe, and can be removed with it. Similarly with the magneto, which is located at the rear on the left side opposite cylinder number six. This is driven from the two-to-one gears at that end of the



Appearance of Model Y, Six-Cylinder Chassis, when the Body Is Removed



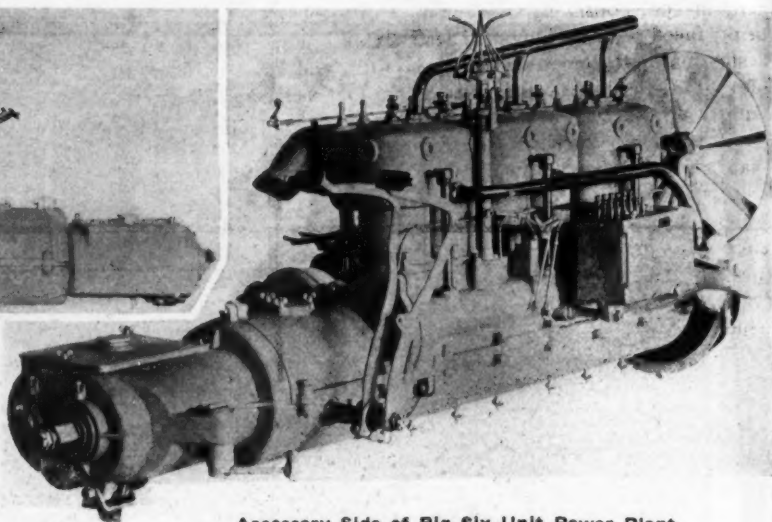
Inlet and Ignition Side of Six-Cylinder Engine

engine through the medium of a small universal joint, which relieves all strain upon the armature shaft, while at the same time allowing the removal of the magneto complete without disturbing anything else. To take off this important accessory it is necessary to loosen but one bolt, the one holding the flexible strap, when the magneto may be pulled forward and up. This rear position of the magneto is claimed to be of special merit, for it is removed from all mud, dirt and water so prevalent at the front end of the chassis.

In the driving gears just spoken of, silence is obtained by the use of fiber for the gear faces, this also doing away with the necessity for lubricating the gears. Camshaft bearings are held in place and adjusted by means of a series of set screws projecting above the surface of the crankcase. These allow of adjusting the bearings or changing the position of the shaft without taking it out. The latter operation is also facilitated by this means, since to take the camshaft out it is only necessary to loosen these screws, two in number, and draw the shaft out.

Cylinders are of special gray iron, ground to size, after a preliminary machining operation. In grinding, water is circulated through the cylinder, wiping out the heat of the grinding wheel and in this way permitting the highest possible rotative speed, which is attended with the best results.

**Accessories Located on the Right Side**—Opposite to the camshaft side, with the carbureter, is the rest of the accessories, located together on the right side of the motor. These include the oiler, pump, timer and the fan drive, which is, however, located at the front. The oiler is carried from the side of the crankcase by a pair of bolts which pass through the base of the oiler. At the front end a cross-shaft drives the pump and oiler. The pump is of the centrifugal type, and the forward position is a change from the old location, which was in a vertical plane alongside the crankcase. Now it is in a vertical plane, but forward, opposite cylinder number one. The pipe is graduated in size from the pump back to the rear cylinder-block, changing diameter at every point. So, too, with the outlet pipe on top of the cylinders; this is of a gradually increasing section, while at the same time it gradually rises to the radiator inlet, so that there are no sharp



Accessory Side of Big Six Unit Power Plant

bends, usually so disastrous, in the water circulating system.

A timer with six contacts is located between the second cylinder casting and the third. This is placed on top of a vertical shaft which is driven from the camshaft on the opposite side of the engine by means of bevel gears. The forwardly located fan is mounted upon a forged arm attached to the motor base, and rotates on ball bearings. It is driven from the crankshaft extension by means of a flat belt.

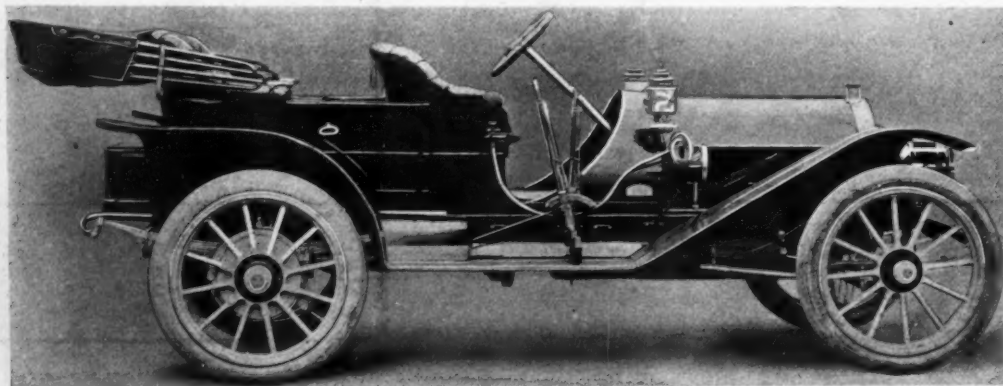
From the oiler, just described, the oil is forced to the main bearings, where, after lubricating, it flows to the lower part of the case. There it forms the source of supply of a splash lubricating system, which caters to the piston, connecting rod and cylinder walls. To drain the oil, pet cocks are provided, and to fill the case when emptied the breather pipes—three in number, seen in the view of this side of the engine—are used.

An important feature of the engine, not apparent from any of the views, is that of accessibility of the pistons, which may be removed from the cylinders bodily by removing the lower half of the crankcase, the bearings being attached to the upper half. These bearings are four in number, of babbitt.

**Chrome Nickel Steel the Transmission Material**—The transmission affords three speeds and a reverse, sliding gears being the medium. These are operated on a quadrant, which shows the Stevens-Duryea individuality. The shifting lever carries a pin which projects through one of the side bars of the quadrant. The slot in the bar is cut with two levels, a low and a high, the lower notch being in two parts, the forward and the rear part. The higher slot unites the other two. At the ends of the notches there are enlargements into which the pin drops so as to preserve the position. In the middle of the upper part, which provides for the low and second speeds, is placed the notch for neutral. This makes the shifting progressive from the low to second to high, and from neutral to low to reverse.

Chrome nickel steel is the material of the gears and the shafts also, both being cut from the solid. Aluminum is the crankcase material, the barrel shape being adhered to for strength. The top of the case is closed by means of a flat cover, in the center of which is a filling cap. This serves to fill the case with lubricant, without the bother of taking off the cover.

Between the transmission and the engine is placed the clutch, which is of the multiple disc variety. This is the same clutch as was developed by this com-



Model XXX, Four-Cylinder, Looks Right with Baby Tonneau Body



pany in 1904, consisting of a number of steel discs, half of them being faced with an almost indestructible lining. This is an asbestos material, composed of woven wire and asbestos fiber, the idea of its use being the increase in the coefficient of friction with steel and such a fiber over that of steel on steel. This is one of the few clutches running successfully without a lubricant; that is, it is what is known technically as a dry clutch.

It is mounted in the second compartment of the unit case, which may be considered to have three compartments—first, the engine base, or crankcase; second, the clutch; third, the transmission part. These, being constructed as a unit, allow the use of a joint between the clutch and transmission, the desirability of which is granted, but which is prevented in the ordinary construction. This joint consists of a squared end on both the clutch shaft and the main shaft of the transmission, over which is fitted a sleeve with a square hole broached in it.

**Numerous Universal Joints Are Used**—Not only is a joint used between the clutch and transmission, but two are used in the propeller shaft, one at the forward end and the other at the rear axle. All of the joints are self-lubricating, since they carry a grease cup, or rather a series of grease cups.

The rear bridge is of very simple construction, leaning as it does toward single and complete units. Thus the propeller shaft

is square at the forward end for the universal joint, and the rear end has the driving bevel cut integral with it. This shaft is very short and can be removed bodily from the case with very little work.

Carried on the large driven bevel is the differential, which has a unique cover arrangement, designed for accessibility. The differential case is made with a series of slots or dovetails in its circumference, into which the slots in the cover fit closely, the holding bolts pulling the cover up tight. These holding bolts are, however, separate and distinct from the bolts which retain the differential in the gear, so that the cover may be removed bodily



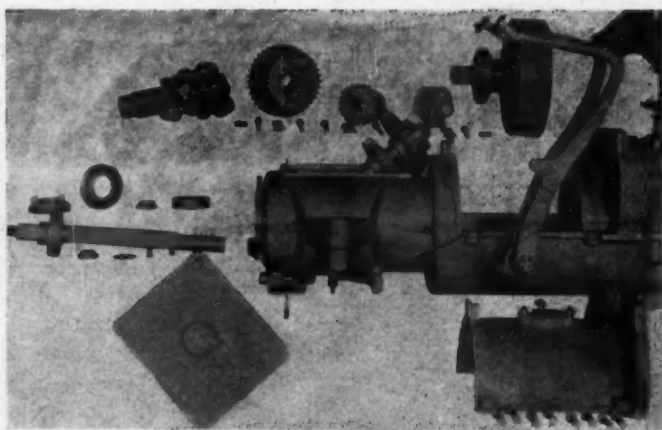
New Steering Connection

or slid off enough to allow inspection of the interior without disturbing the large bevel or differential.

The axle is of the full floating type, the axle proper consisting of a pair of round shafts with squared inner ends and flanged outer ends. The latter are cut with six slots, which fit over a similar number of identical places in the outer end of the wheel hubs. By removing the hub cap these may be drawn out without using force, and while the car is either standing still or running. Different from the ordinary rear axle is the differential unit construction, this being mounted as a separate unit on special ball bearings arranged to take thrust as well. The bearings should never need adjusting, but if they do it is a simple matter to rotate the two collars provided for that purpose, and the adjustment is made. Differential case, bearings and all may be removed by taking off the upper half of the case and withdrawing the axles enough to allow lifting the unit up. The rear wheels revolve on the stationary axle housing, and are equipped with annular ball bearings at both inner and outer ends of the hub.

**Distinctive Steering Gear Construction**—Steering is accomplished through the medium of a gear of the worm and sector type, a distinctive feature being the forging of the gear integral with the shaft of the steering post. Another of equal merit is the attachment of the sector to the steering arm by means of a taper square, which never wears out or becomes loose. Adjustment is made through a hardened eccentric bushing.

Platform spring suspension is used on the rear end, the correcting shackles being so designed as to overcome the side roll



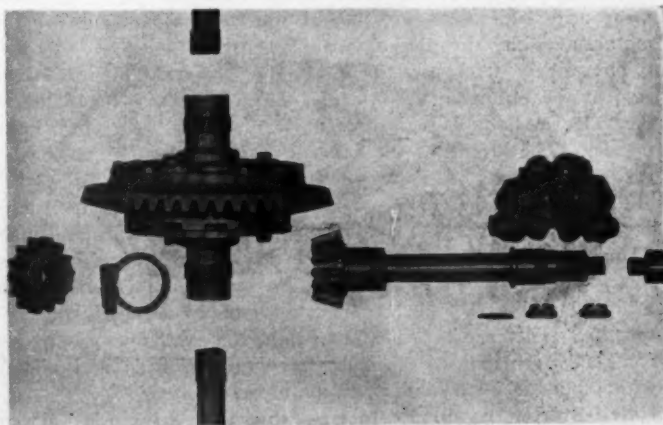
As the Transmission and Clutch Look Dissembled

on curves. Both springs are of special design, which dispenses with the usual binding bolt in the center, a common source of weakness. The forward ends of the springs are attached directly to the frame, but do not take any of the torsional effort of the drive, a torsion rod of large diameter being fitted for this purpose. It is attached to the cross member, which carries the rear pivot of the three-point suspensions by means of a ball joint connection, making a very flexible arrangement. The spring material is special, designed to have the greatest possible elastic limit and strength under compression, while at the same time retaining its flexibility, which makes riding such a pleasure.

The price of the six-cylinder car, Model Y, is \$4,000; with top, \$150 extra, and tire irons, \$25 extra. Models X and XXX both sell for \$2,900, but the runabout body is \$50 less. For the baby tonneau the top with slip cover is \$135, while top for the runabout is but \$100 extra.

### EJECTOR MUFFLERS ARE VERY PROMISING

In this type of muffler it is the aim to utilize the energy that remains in the exhaust to create a vacuum and aid in the process of cleaning out the exhaust ports of the motor, as well as eliminating noise. Increasing power is one of the advantages sought, and there is no reason why this should be attended by additional noise. The principle involved requires that the flow of gas be directed through a nozzle in such a way that a vacuum will be created in a chamber concentric with and surrounding the muffler chamber proper, the vacuum is due to increasing speed resulting from the use of the nozzle, and the vacuum is filled by gas shunted from the stream that supplies the nozzle, which stream is "baffled" to some extent in its passage. In this way the energy in the gas is expended and the lowering pressure is attended by a reduction in noise; power of the motor increases due to the elimination of back-pressure, and to some extent by virtue of the vacuum.



Stevens-Duryea Differential Case and Universal Joint



**S**TARTING with the startling statement, "The best car in the world has been made better," the announcement of the Winton Motor Carriage Company, Cleveland, O., proceeds to give the details of the car which will be found changed from now on, the 1909 output having been disposed of, so that the factory is now working on the 1910 cars. These include, as mentioned briefly in THE AUTOMOBILE's advance notice, page 72, July 8, a larger clutch, an improved carbureter, a new front axle, longer wheel base and springs, as well as a number of minor and less important changes.

The engine remains unchanged, with six 4 1-2 by 5 inch cylinders, rated at 48.6 horsepower. The cylinders, cast in pairs, with water jacket completely surrounding each individual cylinder, are made of tough, close-grained iron; ground to mirror smoothness, assuring long life, freedom from wear and positive compression. Cylinders are submitted to hydraulic test of 300 pounds per square inch before use.

**Offset Feature Retained After Severe Test**—Cylinders are offset from the crankshaft, securing from the motor its maximum power efficiency, reducing and equalizing side thrust against cylinder walls, and eliminating the "knock" which always tends toward loosening of parts and premature decay of the motor.

Long connecting rods reduce angularity of operation and long pistons avoid "cocking," decrease wear and friction in cylinders. three snug-fitting, eccentric piston rings on each piston assure good compression and power at all times. All pistons, rings, connecting rods and wrist pins of same weight per set, giving perfect balance. Interchangeable, mechanically operated, two-piece adjustable valves of liberal size, all on one side of the motor, avoiding the use of two camshafts.

The nickel steel used in the valves offers high resistance against the oxidizing and warping effect of hot gases. Due to the valve motion, there is no temporary sluggishness in Winton motors. The profile of the cams is such that it gives a flow of gas proportionate to piston speed.

The crankshaft is made of specially treated nickel steel, having a tensile strength of 125,000 pounds to the square inch. There are four large bearings, bushed with Parsons' white brass. Bearing surfaces are ground. An aluminum crankcase is equipped with three 5 by 8-inch hand-holes to permit instant inspection. The case is divided into right and left halves to provide for ready removal of crankshaft, connecting rods and piston, without disturbing cylinders or motor accessories.

**Self-Starter Again Featured**—Now that so much talk is going the rounds about starters and starting devices, it is not

strange that the starting arrangement which has been so successful on the Winton cars for the past two years is retained and featured. The arrangement of this is as follows: Tubes running from the first and sixth cylinders carry part of the combustion pressure to a storage tank under the body. Here it is stored until required for starting purposes. The driver then opens a push valve on the dash, and the compressed air rushes through a rotary distributor valve to the two cylinders just over dead center. This pressure pushes down these pistons and, on the occurrence of a spark, the motor starts. The entire mechanism has only one moving part—the distributor valve. An attachment on the self-starting equipment permits tires to be inflated without the use of pump.

Assembled on the dash are: (1) the gage, which shows the amount of pressure stored in the tank; (2) the push button, which allows pressure to flow from the tank to the cylinders, and (3) a shut-off valve, for use when the car is to remain long idle, preventing escape of pressure from the storage tank.

Water circulation is secured by a gear-driven, centrifugal pump, having throw of unusual power. The water is filtered before it passes through pump, making it impossible for water to clog in the radiator or to cease circulation even though pump should become deranged; in that event, water passes through the pump chamber and the circulating system on the thermo-syphon principle. The new design vertical tube radiator is of extra large size, made of copper tubes, with fins. Tubes are lengthened 1 inch. Radiator filler lengthened 1 inch, and has notched hard-rubber cap. Radiator fan is gear driven through friction clutch, securing proper suction of air without possibility of accident to fan or adjacent parts.

Lubrication is force feed, the same as in 1909, and ignition is by Eisemann magnet, with storage battery to supply auxiliary current for starting. The carbureter represents the result of Mr. Winton's long experience in carbureter work. It is of the single-nozzle type, without auxiliary air inlet, and is equipped with two throttles, which work in combination. The carbureter assures economy of fuel and satisfactory operation at all speeds, and obviates the difficulties often encountered at slow motor speed. No automatic air valve. Carbureter is placed on the opposite side of the engine from valves. It is throttled mechanically by lever from steering column or foot button at driver's right foot. Carbureter primer is on the dash.

An oil pump operated by an eccentric on the rear end of the crankshaft takes oil from the oil tank at the left side of motor and delivers it through leaders to the crankshaft main bearings



and the front gears. A second pump, operated by the same eccentric, draws oil from the crank case (where it is deposited by gravity), and returns it to the oil tank, whence it passes through a strainer before being used again. No large volume of oil in crank case to drip into pan. Flow of oil is proportionate to motor speed. By-pass regulates quantity. The cylinders are fed by splash. Transmission gears and clutch run in oil and are constantly bathed in lubricant. Oil grooves in cylinders and pistons distribute the oil around their entire surfaces.

**Next in Importance Is the Transmission**—Probably the details of the gear box will excite more attention than any other one part because of the changes made in it. It is of the selective type, sliding gear transmission, supported on annular ball bearings. There are four forward speeds and reverse. Direct drive is on the third speed, through internal and external gear combination. Lockout on fourth speed. The selective system permits any gear change without passing through any intermediate gears. The gears are of special alloy steel, hardened, and ground to perfect fit. Selective and interlocking mechanism is entirely enclosed in the transmission case, assuring freedom from dirt and allowing proper lubrication. The selective mechanism makes it possible to enter neutral position, but impossible to engage any new set of gears while clutch is engaged.

And the clutch, too, will arouse much interest since it has been enlarged, the number of springs changed and a few minor changes made in it. The multiple disc clutch is tested to hold 90 horsepower at 1,000 revolutions per minute. Of its 67 steel friction surfaces, 33 are attached to the transmission shaft and 34 to the driving spiders, which are connected to the fly wheel, thus observing the mechanical principle that the parts having the least inertia be attached to that part of the mechanism having a variable velocity; as, for instance, when gears are shifted. The clutch discs are 50 per cent. larger in diameter.

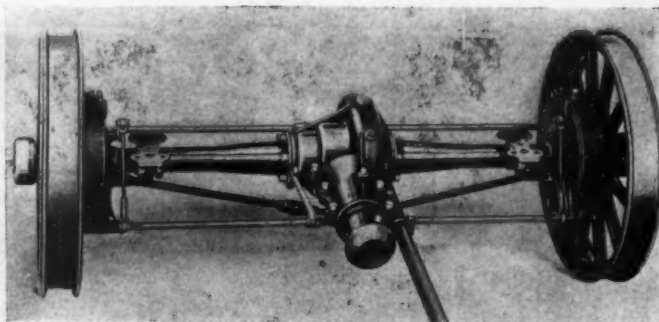


The New Front Axle Is Of Pressed Steel

The discs revolve constantly in an oil bath. This eliminates wear and allows the transmission of the power of the motor to the driving wheels so gradually (owing to its many members, with film of oil between), that shocks to the transmission are unknown. There is no gripping even when starting the car on the third speed. The clutch is carried on annular ball bearings. There is no end thrust on bearings when clutch is engaged. No special lever is necessary to separate the discs when clutch is disengaged. Clutch is contained in the transmission case and is immediately accessible through hand-hole. Four springs, placed at equal distances around the clutch, distribute the tension equally on the discs. Springs are readily removed and replaced. Clutch pedal cannot be locked with the clutch out of engagement, this being a precautionary measure, necessitating neutralizing of gears when car is stopped. Clutch and hand brake are interconnected. The entire clutch mechanism is extremely compact, and the operation of the clutch requires little foot pressure.

**Frame Is Narrowed at the Front End Now**—Among the incidental improvements is an inswept frame, which permits the car to be turned in short radius. This is all the more desirable now, inasmuch as the wheel base has been lengthened to 124 inches as against 120 inches last year. The additional space thus provided in the body affords the passengers more than ordinary foot room, both in front and back. The body is wider than before, and has a low, rakish look. The low effect has been gained by the use of semi-elliptical springs without scroll. The new car carries four shock absorbers and four rubber bumpers.

The side rails and drop members are of one-piece, channel-



Winton's Rear Axle Construction For 1910

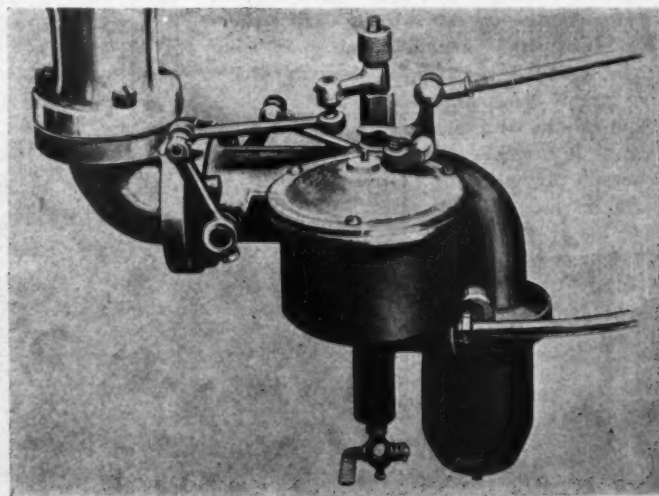
section, pressed steel, strengthened at their intersections with heavy gussets of particularly effective design. Motor, clutch and transmission are carried on drop frames. There is no sub-frame.

Rear axle is of the full floating type, the axle proper carries no load, but merely transmits the power from pinion shaft to driving wheels, the weight of the car being carried on a heavy drawn steel tube which surrounds the axle. Consequently, it is possible for the axle shafts, differential gears and differential bearings to be removed from the car without the use of jack or pit, car remaining supported by the wheels. Special Timken roller bearings are used throughout. Drop-forging is the process which produces the nickel steel gears and pinions.

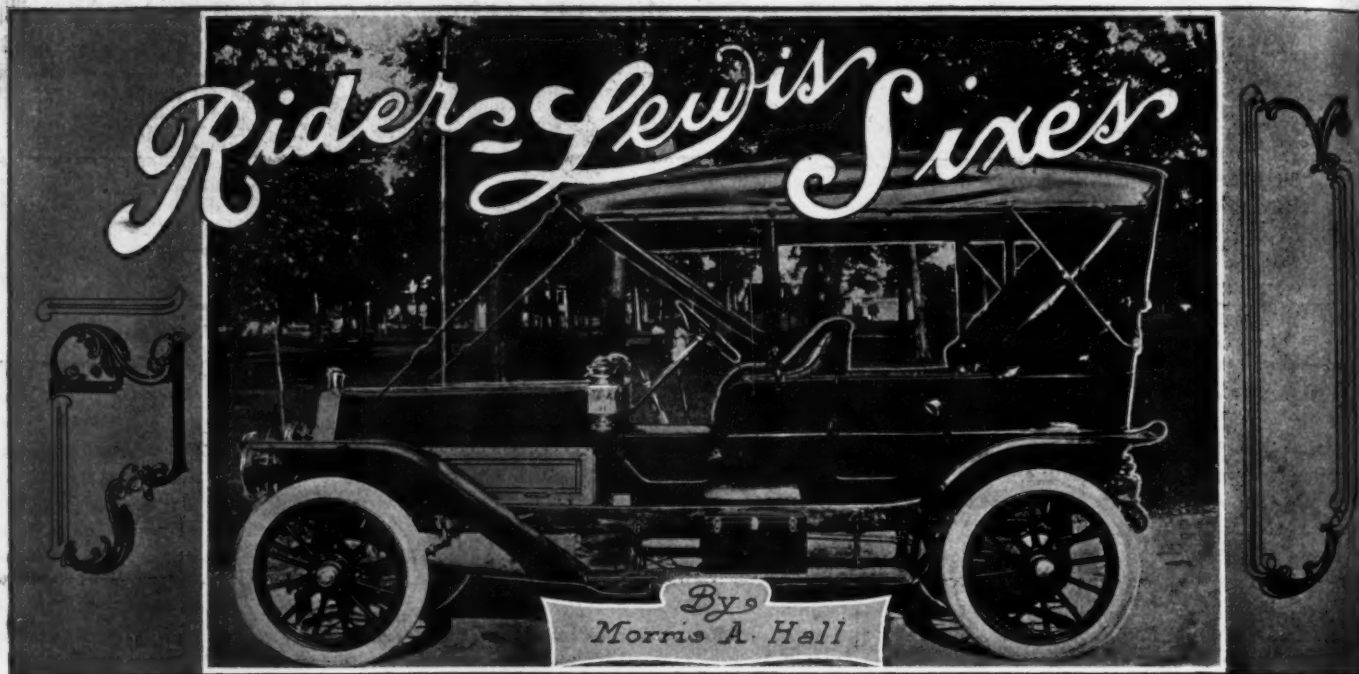
**Front Axle Shows a Decided Change**—The new car is characterized by a front axle of channel section pressed steel, of a new design, which promises great strength and stability. The central portion (there are three parts to the axle) forms the dropped bed, while the end portions carry the bearings.

At the purchaser's option the car will be fitted with long or short pedals for clutch and brake, and when desired the gear-change and brake levers will be placed nearer the seat than on standard equipment. The radiator is of handsomer design than before, and in making this change the radiator tubes were slightly lengthened, as was also the filler. The filler cap is of hard rubber. Solid brake spiders and increased brake leverage are new features. The oil tank has been enlarged, as has also the front universal joint, which is equipped with a lubricant retainer. There are oil cups on the springs. Running boards and guards are wider than before. Rear guards drop over the wheels. Running boards and front floor are covered with pressed aluminum.

The price remains unchanged at \$3,000 for the 48 horsepower Winton Six when equipped with either touring car, runabout or toy tonneau body. When equipped with limousine body the price is \$4,250, and with landaulet body, \$4,500. For the third successive season the Winton Company will manufacture sixes exclusively. In addition to the 48 horsepower car, there will be a 60 horsepower Winton Six at \$4,250, specifications to be announced later. The output of this larger model will be limited.



There Is A Double Throttle On The Carbureter



NOW that the question of "sixes" versus "fours" has been settled to the satisfaction of all concerned, it will not be necessary to go into constant torque, regular firing, and all those points upon which the advocates of the "six" delight to enlarge. Suffice, then, to say that the Rider-Lewis Motor Car Company, of Anderson, Ind., in pinning its faith to the six-cylinder motor, is making no mistake. Housed in a large, new and very modern factory, with abundant floor space, contented workmen, and an efficient engineering corps, the company will now proceed to devote all of its energy to turning out a small number of machines, as nearly perfect as human skill can make them.

**Motor Shows Individuality.**—In the engine, probably the most important part, a difference from the ordinary run of cars is noticed at once. This has a number of features not found on any other engine. Thus, the valves are located in the heads, in removable cages. A construction like this allows of the ready removal of the valves for inspection or grinding, and without disturbing any other part. The cylinders of four-inch bore and the same stroke are cast individually. The upper part is given a globular shape to correspond to the spherical combustion chamber, the size being such as to allow of the cooling water being freely circulated around the valve cages. The valves are operated by means of rocker arms, which in turn are actuated from an aluminum-enclosed, overhead camshaft. This is driven from a vertical shaft at the front end of the motor, with a bevel drive from the crankshaft and driving the overhead shaft in a similar manner. Pistons

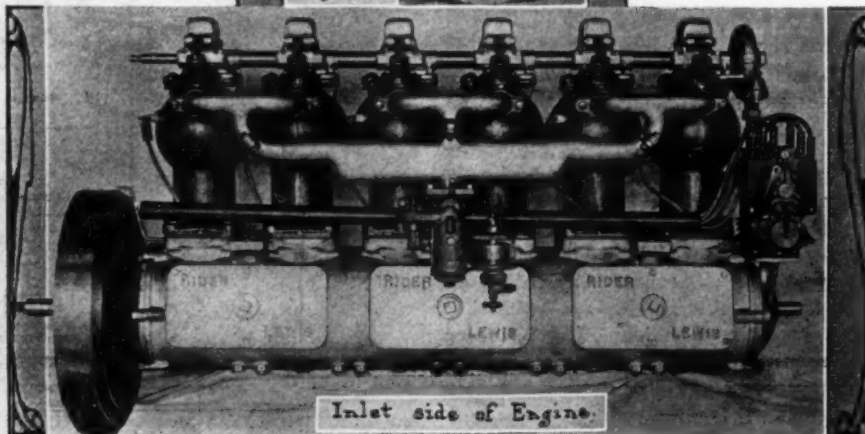
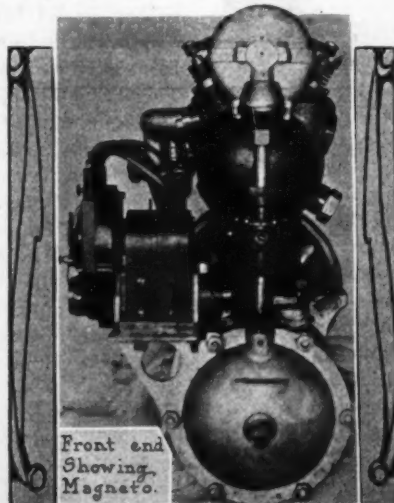
are fitted with four rings, three at the top and one about the middle of the piston, the latter being used to retain the piston pin from lateral movement.

By means of four large-sized bolts, the cylinders are fixed to the upper surface of the aluminum crankcase. This is in one piece of the now popular barrel type, the crankshaft being entered from the ends, which are closed by means of a pair of circular plates. White brass bearings are used in these plates and in the crankcase bearings, five in number, making seven in all. In the connecting rod and camshaft bearings, phosphor bronze is used.

**Aluminum Used Freely.**—The inlet pipe is of cast aluminum, in three pieces, bolted together and to the cylinders. The carburetor is located midway of that side of the engine, and rather high up as carburetor location goes. The exhaust pipe, on the other hand, consists of six separate pipes, set slightly out of a vertical, brazed to a horizontal header. The latter is of unusually large diameter, in order to eliminate all back pressure. Water is piped to and from the cylinders in a manner differing from both the inlet and exhaust piping. Into each cylinder, at the rear, top, central part and the left, under side of the hemispherical cylinder dome is screwed a fitting.

To this is screwed a union. The inlet and outlet pipes, *per se*, are castings of a tapered section, threaded at the seven extremities. To connect the castings with the cylinders, a short bent pipe of brass with a union connection at each end is used.

Ignition is single, high tension being used, with a Bosch magneto as the source of current. This is

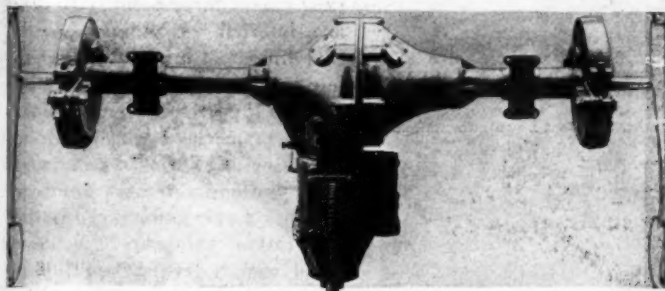




located in front and is set across the engine, being driven from the vertical shaft through bevel gears. If it should be desired, double ignition can be had at practically no extra expense, because the rear extremity of the overhead camshaft is arranged to take any standard timer. The magneto position allows of very simple wiring.

**Transmission and Rear Axle Form a Unit**—Conforming to the practice of placing the transmission on the rear axle, even in this originality is shown. The dead weight is kept down as low as is consistent with strength by the use of an aluminum case. This, considering the differential housing as an integral part, is in three sections. The forward one is but a hand hole to allow the entrance of the gears. The central portion has the left half made separate for the same purpose, namely, the admission of the axles and differential. All three are liberally ribbed to give strength. Hand holes are provided in the forward portion for the inspection of the gearing, while the rearward part has a pair of oil holes, which are so large that one can see the gears through them.

The transmission is of the sliding type, operating on the selective principle, and furnishes three speeds. All gears are of chrome nickel steel, on chrome nickel shafts, which are mounted



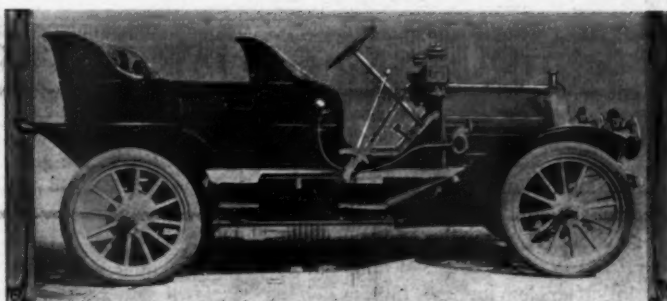
Rear Axle and Transmission Unit Is Distinctive

upon roller bearings. The torque reaction is taken by a long stiff rod of circular section. This is fastened to the frame at its forward end by a ball joint.

Old and reliable describes the clutch, which is of the cone type, faced with leather. It is operated directly from the pedal shaft, one of the only two shafts crossing the chassis, by levers with rollers which press against a large collar. Although the spring is inclosed, the construction is such as to allow of easy adjustment from the outside. Directly back of this is placed the only universal joint used.

Front axles on the Rider-Lewis sixes are I-section forgings of large section, the material being steel. The pivots are of the Elliott type, and to their design much care has been given so as to insure safety at this important point.

**C Type of Rear Spring Makes Riding Easy**—The spring suspension is equally good, semi-elliptic being used in front, while in the rear, superior riding qualities are obtained by the use of the C type of spring. In the use of this, the lower leaf is rigidly attached to the frame after the best semi-elliptic prac-



Straight Line Touring Body on Four-Cylinder Chassis

tice. The size of the front springs is 36 by 2 inches, and of the rears, 38 by 2 inches with eight leaves. Both springs are banded. The frame is of pressed steel, to which is riveted the brace and tie members. This is dropped at the rear for a low center of gravity and narrowed in front to allow of a large steering lock. Steering is effected by an irreversible gear of the screw and nut variety. This has a horizontal fore and aft connection to the cross steering rod, placed in front of the axle.

Two markedly different bodies are fitted, the full touring shown in the heading of this article being known as Type VIII. For the runabout body, the construction is altered somewhat to provide more rake in the steering post. This and other minor changes make it somewhat different from the touring car, so a different model number is given it, Type IX. The price, however, is the same for both, \$2,500.

**And a Good-Looking Little Car, Too**—In addition to the full line of sixes, an excellent little car, to sell at a popular price, has recently been added to the factory output. This has a four-cylinder engine of 4-inch bore and 4½-inch stroke, rated at 30 horsepower. In this, however, the four cylinders are cast in a block. The crankshaft has but three bearings. Cooling is by thermosyphon, and oiling is self-contained. This car is built to be of an unusually light weight, the weight ready for the road being less than 1,800 pounds. As this gives a very low ratio of weight to power, less than 60 pounds, the car is very powerful either on hills or speeding. The light weight is obtained in part by the elimination of needless parts, thus there is but one cross member in the frame.

One big feature of this little car, which is bound to make it popular is the fact that it is equipped with a three speed sliding gear transmission, which operates on the selective principle. The use of a block motor gives a very short hood, which, in turn, gives the greater part of the long wheelbase space to the body and in this way allows it to be more roomy and comfortable. The wheelbase is 100 inches and the wheel sizes 32 inches. To these are fitted 2½-inch tires, large enough for the light weight.

Selling at an even \$1,000, this chassis is equipped with a touring body of the straight line type. This resembles the roadster body fitted to the six-cylinder chassis, except for the tonneau in place of the bucket seat of the latter.



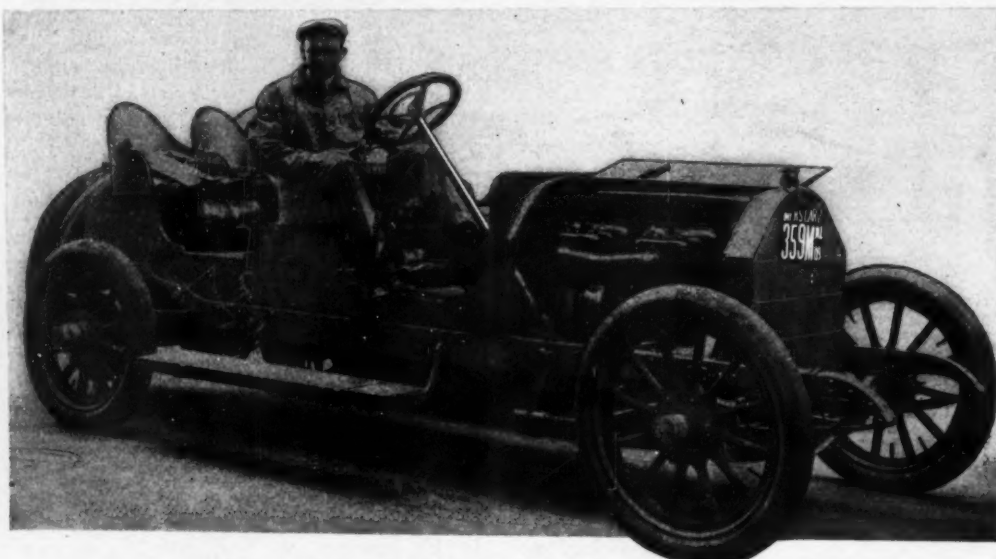
Modern Factory of Rider-Lewis Motor Car Company at Anderson, Ind., as it Appeared Just Before Completion

## HOUPPT CAR MAKES ITS METROPOLITAN DEBUT

THE first of the new Houpt cars returned to the factory at Bristol, Conn., after an 800-mile test trip with Montague Roberts at the wheel, and the makers are well satisfied with its performance. For the last month the car has been traveling over some of the roughest roads in New England, New York and Pennsylvania, yet Roberts declares that he did not once open his tool kit after leaving the factory. This car is of the four-cylinder, 60-horsepower type; the six-cylinder model also planned

and quick acceleration, combined with practically noiseless operation. The carbureter is float-feed, the gasoline being under pressure in a tank slung from the rear of the frame. The water-cooling system employs a centrifugal pump with both radiator and flywheel fans. The ignition is double, with a single set of spark plugs in the cylinder heads.

Power is transmitted through a multiple-disc clutch containing 53 steel-on-steel discs, and the change-gear is of the selective type, giving four speeds and reverse. Drive is by a nickel-steel cardan shaft to a full floating type of live rear axle, with bevel differential. The frame, also of nickel steel, is dropped forward of the rear axle and rests on semi-elliptic springs both front and rear. The motor suspension is four-point and that of the gear case three-point. Brakes are internal expanding on the rear hubs and external contracting behind the gear case. The wheelbase of the four-cylinder car is 127 inches; wheels are 36 inches, with 4-inch tires in front and 5-inch in rear. The car weighs 3,100 pounds. In the illustration the car is shown fitted with a testing body; purchasers, however, will have the choice of seven different styles.



Montague Roberts at the Wheel of the New 60-Horsepower Houpt

by the Houpt Company will not make its appearance for another month yet. However, the Houpt Company promises to have at least three of the four-cylinder cars in New York by August 1, and will enter a team for the coming 24-hour race at Brighton Beach. One of the entries will be driven by George Robertson, last year's Vanderbilt winner.

The Houpt car is thought to be the largest four-cylinder stock car made in this country; its cylinders are 5 1-2 inches bore by 6 inches stroke, rated at 60 horsepower. The cylinders are cast in pairs, and the valves, 2 5-8 inches in diameter, are placed on opposite sides. In general the motor follows standard design. In the tests at Bristol, the motor showed exceptional power

under way will have cylinders of the same size as the four—that is, 5 1-2 by 6 inches; and its power will be conservatively expressed by the maker's rating of 90 horsepower. Its specifications are identical with those of the four except as to dimensions. The wheelbase will be 140 inches and the weight 3,900 pounds. In addition to the Houpt cars, the Houpt Company in New York City will continue to act as distributor of the Herreshoff, as the two lines in no way conflict with each other.

Although the design of the Houpt is in direct opposition to the present tendency toward smaller cylinder sizes, its makers believe that there are plenty of automobilists in the metropolitan district who will welcome a car of racing proportions.

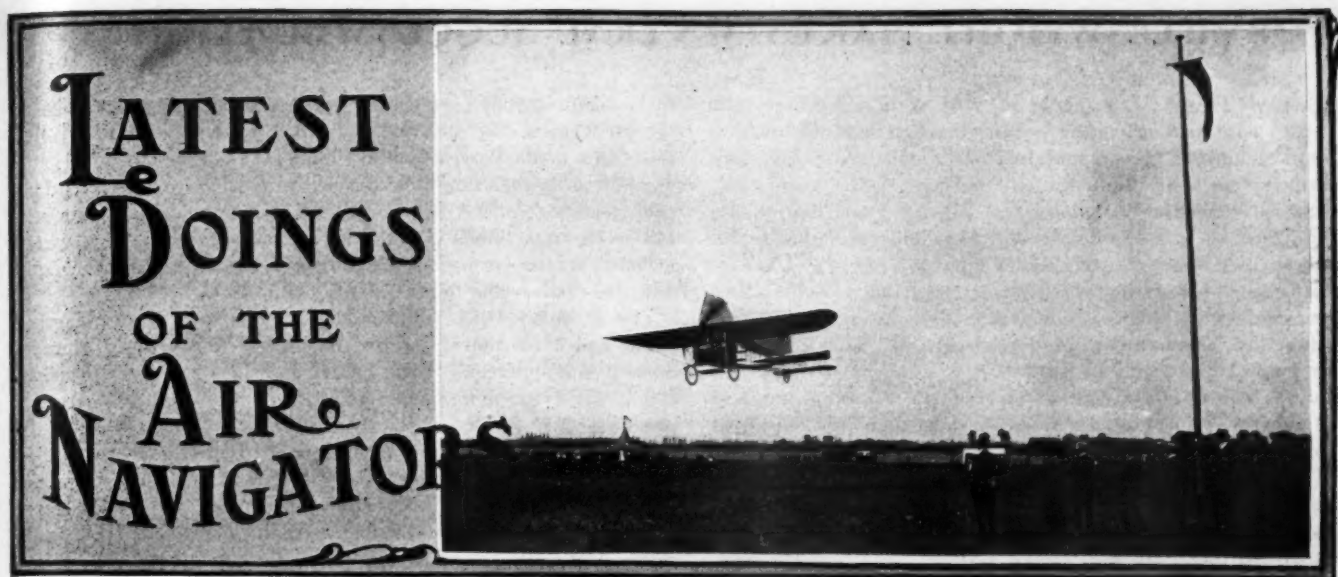
### DETAILS OF THE 1910 FRANKLIN MOTOR

The new Franklin motor, like all its predecessors, is air-cooled, but the method of applying the current of cooling air is radically different and completely changes its exterior appearance. Encircling the motor on the level of the chassis frame is a sheet-metal deck with funnel-like casings which encircle each cylinder and tightly embrace their vertical cooling fins. Underneath the motor is the usual mud-pan, but this, in connection with the upper sheet-metal deck, forms an air compartment whose only openings are those of the cylinder funnels. At the rear of the compartment is the flywheel, containing a powerful suction fan which draws a current of air through the funnels. By this system the air currents are downward, striking first the hottest parts—the tops of the cylinders and the valves—then passing along the cylinders and out through the flywheel. The familiar Franklin features of the auxiliary exhaust, the concentric inlet and exhaust valves and the dome-headed cylinder, are still retained. The usual fan in front of the motor is dispensed with, and this, together with the smooth funnels encircling the cylinders, gives a very simple and neat appearance.

### ABOUT PRESSURE FEED GASOLINE TANKS

Considering the difficulty involved in connection with gravity feed fuel tanks, if they are of considerable depth—thus requiring that account be taken of the resultant changing pressure due to the difference in "head"—the usual practice, in the process of avoiding such changes in pressure, is to use pressure from the combustion chamber of one cylinder of the motor, passing the same through a reducing valve, the function of which is to take the uneven wave of pressure from the source and level it down, as well as reducing the pressure per square inch to that agreeable to the requirements, which should not exceed the amount which will assure that the gasoline will positively flow to the carbureter, even with some jelly formation in the system. A difference of pressure equal to 30 inches of water ( $0.0358 \times 30 = 1.074$  pounds per square inch) should be adequate for the purpose, even taking into account a considerable gradient of the road, and the car so designed that the gasoline would have to flow up grade one-half of the 30 inches above noted. Since a grade of fifteen inches in the ordinary 120-inch wheel base is seldom met, this is safe practice.





Bleriot Making Successful Flight at Juvisy, in Which He Came Dangerously Near Breaking Monoplane Record

PARIS, July 13—Louis Bleriot, the French monoplane champion, narrowly missed establishing a world's record Sunday July 4, during a magnificent flight with his No. XI, at Juvisy, near Paris. He remained in the air for 50 minutes 8 seconds, being forced to descend because he was blinded with the splashing of oil from his engine. The longest flight ever made on a monoplane type of machine is 1 hour 7 minutes, accomplished by Hubert Latham.

The Bleriot performance was accomplished with a comparatively small machine driven by an Anzani three-cylinder, air-cooled motor of 25 horsepower. In order to assist in cooling, the engine is fitted with auxiliary exhaust ports at the end of the stroke. Whenever there is a slight excess of lubrication, the oil is forced through these holes into the face of the pilot, placed immediately behind the engine. On more than one occasion a flight has been stopped by this reason alone.

Louis Bleriot has also the intention of making a record cross-country flight of not less than 25 miles. His machine was this week taken down to Etampes in readiness for the flight, but owing to a gale of wind and rain no flight could be attempted. The apparatus was left on the spot, and will be brought out in a few days. The flight is the most ambitious one across country yet attempted, for although the country is fairly flat there are serious obstacles in lines of poplar trees rising to a height of 65 feet, the railroad and telegraph wires. Starting from near Etampes, the aeroplane will make almost directly for the town of Orleans, the descent to be made three or four miles from the city limits. The machine to be used for this flight is the monoplane No. XI, equipped with the three-cylinder Anzani motor.

### LATHAM FLIES HALF ACROSS THE CHANNEL

CALAIS, FRANCE, July 19—Hubert Latham made a gallant attempt to cross the channel with his Antoinette monoplane to-day, but was forced to come down with his task but half accomplished on account of the failure of the motor. He was picked up by a torpedo boat, along with his machine, and carried back little the worse for the experience.

Latham has been at Calais for over a week, making practice flights and watching for a favorable opportunity. Yesterday a stiff breeze, which had been blowing all day, subsided at sunset, and in anticipation of an early start, Latham slept in the aeroplane shed at the edge of the cliff looking over the Channel. At the first streak of dawn all turned out. The sea was smooth and the wind, a mere breath. The authorities at Calais had been notified, and a torpedo boat detailed to follow the flight waited at the foot of the cliff. Several thousand persons had assembled

when the aeroplane was wheeled from its shed and brought to the starting point. Latham made a careful inspection and tested the motor, which worked perfectly. He wore a life preserver.

When all was in readiness he mounted; the motor was started, and with a farewell cry of, "See you in Dover" he swept to the edge of the cliff, tilted the elevation plane and the machine sailed gracefully out over the water. It mounted gradually to a height of about 300 feet and continued its course steadily toward the English shore, at the rate of about thirty-five miles an hour.

Twelve miles, over half the distance, had been covered when the motor began to slow down. Latham found his attempt was hopeless and gradually sank down to the water, in a smooth, even glide, alighting with hardly a splash. The air entrapped under the curved wings kept the machine afloat, and Latham kept his seat, putting his feet up on a cross-bar, and lighted a cigarette. The torpedo boat, which had been steaming at top speed, soon caught up and he was rescued from his perilous position. On the return to Calais an enthusiastic crowd waited on the wharf to cheer him.

Latham said that he thought he was fully a thousand feet in the air when his motive power gave out, so that even though his attempt failed he can claim to have established a record for altitude. The best previous record was 450 feet, established by M. Paulham with a Wright aeroplane. The machine was but slightly damaged, most of the injuries being incidental to hauling it aboard the torpedo boat. Latham left for Paris to-night, saying that he would be back in a week or ten days to try again.

### LAMBERT MAY TRY CHANNEL FLIGHT

WISSANS, FRANCE, July 19—Count de Lambert, one of Wilbur Wright's pupils, has brought two Wright aeroplanes here and is preparing to make a series of flights. It is believed that he may make an attempt to cross the Channel before Latham can get ready again. If he succeeds it will secure great prestige for the Wright machine, which has been rather overshadowed by the feats of the Antoinette monoplane type.

### PAULHAM MAKES CROSS-COUNTRY FLIGHT

ARRAS, FRANCE, July 19—M. Paulham, who has been making many short flights near here with his Wright aeroplane, to-day flew across the fields from this town to Douai, covering the twenty kilometers (about twelve and a half miles) in twenty-two minutes. He attempted to return; but after going three kilometers was forced to descend by the rising wind. In the landing his rudder was broken.

## ORVILLE WRIGHT MAKES SEVERAL SUCCESSFUL FLIGHTS

WASHINGTON, D. C., July 20—The Wright brothers seem to have shaken off the hoodoo that has been so much in evidence recently. The tumble July 14, when one of the skids was broken—the third accident of the present trials, by the way—was its last manifestation, and everybody at Fort Myer hopes that it has gone to stay. Contrary winds and rain storms prevented any trials on the two following days, but the brothers spent the time in altering the starting apparatus. They added about sixty pounds to the weight which gives the initial momentum, dug a pit a foot deep to give it a longer fall, and lengthened the starting rail by about 12 feet.

Saturday saw the first trial of the remodeled mechanism, and it was greatly encouraging. After one short flight the length of the field, which was stopped to avoid a collision with the balloon house, Orville Wright got away in good shape. This time he cleared the house by fifteen feet, and maintaining the inclination of his forward plane he soon soared over the spectators at a height of 100 feet. He made about sixteen circuits of the field, but did not follow any regular course. On several occasions he made wide excursions out over the wooded country behind the balloon house, and seemed to delight in sailing over the cavalry stables and over the tall chimney of the post's power house. Apparently he wishes to accustom himself to soaring over rough and broken ground, as he will have to do in the official trials. The landing was made without the least jar, and stop-watches caught the time at 16 minutes 54 seconds. His speed was estimated at 40 miles an hour.

This flight, however, was far surpassed on Monday, when the aeroplane covered about forty miles altogether. The Wrights ordered the machine from its shed about 6 P.M., after the breeze that had blown all day had died away. They worked some minutes over the motor, and then Orville took his seat and shot away. After several smooth rounds of the field at an elevation of about eighty feet, just to get the feel of it, he began to put

the machine through its paces. First he swooped down close to the earth, then rose steadily to about a hundred and twenty-five feet, and made several more rounds. Then he ascended still higher, and at the same time narrowed his circles, with the rudder held steadily to port. The sun had set, but the aeroplane was still full in its rays. Finally Wilbur, who had stood watching, watch in hand, waved his hat as a signal, and Orville swept gracefully down to earth. The flight lasted 25 minutes 18 seconds.

The aeroplane was immediately carried back to the starting point, and after the motor had cooled off it was again started. Soon it was describing great circles at nearly 150 feet elevation. For a while the motor ran irregularly; the skipping of its explosions could be heard plainly. Still the flight continued. In the gathering darkness the machine was often completely lost to sight, only becoming visible as it tilted on the turns. When the planes presented only their thin edges they were completely invisible. This fact especially pleased the officers of the Signal corps, as it demonstrated a great advantage of the use of the machine for scouting and carrying dispatches. It was after eight o'clock when Orville decided to come down. He chose his landing place with great care, swooping down and then ascending several times. He finally descended within a few feet of the shed, after a flight of exactly thirty minutes.

### WRIGHT MAKES NEW AMERICAN RECORD

WASHINGTON, D. C., July 21—In a spectacular flight late yesterday evening Orville Wright established a new American record by remaining in the air one hour 20 minutes and 45 seconds. The aeroplane made sixty or seventy circuits of the field, interspersed with several figure 8's, and at times attained a height of 300 feet. Some of the circles were so short that the flier seemed to be turning almost within its own length. The motor worked perfectly.

## CURTISS AEROPLANE WRECKED BY NOVICE OPERATOR

AFTER a magnificent flight of nearly an hour, placing him easily second to Wright brothers in this country, Gleen H. Curtiss saw his aeroplane wrecked on the grounds of Mineola, L. I., last Sunday by one of the two men whom he was teaching to operate it, in accordance with his agreement with the Aeronautic Society. His pupil, Alexander Williams, lies in the hospital with a broken arm. Although Mr. Curtiss took the train for his factory at Hammondsport, N. Y., immediately after the accident to secure repair material, he will be unable to continue his flights before next week.

The aeroplane was to have been delivered to the Aeronautic Society this week. One of the conditions of its sale was that Curtiss should teach two members of the society to operate it. The two selected were Mr. Williams, who became known through his attempt to build an aeroplane of his own at Morris Park, and Charles F. Willard, a young automobile engineer who has an office at 1777 Broadway, New York. Sunday morning the two met on the grounds for their first lesson. Mr. Curtiss first made a short flight of 7 minutes 40 seconds in perfect form, rising to a height of 150 feet and describing circles and figures 8s.

After this preliminary the two pupils flipped a coin and Willard won. He mounted the seat of the aeroplane and started across the field. The machine soon rose easily into the air and sailed along steadily at an elevation of 10 to 15 feet. After covering about 500 feet Willard slowed down and touched the ground for a moment, then rising again continued for about 200 feet more. Mr. Curtiss was delighted and declared that it was better than his own first flight.

After the machine had been brought back to the starting place Williams climbed into the seat. Apparently trying to imitate Curtiss' previous flight, he at once tilted the front plane to a sharp angle and lifted the machine to a height of 40 or 50 feet. Then he turned the steering wheel full over and sent it sharply to the right. The sudden twist tilted the planes over at an angle of 45 degrees. Then Williams lost his head completely and was unable either to straighten out or to shift the balance planes to regain an even keel. After a few spasmodic movements the framework of the machine seemed to give way under the strain and the whole fabric shot down to the ground, the motor still crackling steadily.

Williams was pulled from the wreckage unconscious, but it was soon found that he had suffered only a broken arm and thumb. The machine was carried back to its tent. It was badly smashed, but the motor, fortunately, escaped uninjured.

Mr. Curtiss began his trials at Mineola July 13, making three short flights. Wednesday, July 14, he flew about five miles in seven minutes. Thursday was foggy and he made only two short flights. The next day, however, he circled the field ten times, covering about 15 miles in 22 minutes 20 seconds, and Saturday, in the presence of 3,000 spectators, he made the best flight that has been seen in America this year. It lasted 52 minutes 30 seconds, and it is estimated that he covered about 30 miles in his 19 circuits of the grounds. This flight qualified Curtiss for the Scientific American trophy, which he at present holds.

In the international aeroplane race at Rheims, France, August 28. Mr. Curtiss with his American-built machine will match his skill against the leading aviators of Europe.



## MASSACHUSETTS LAW DOES NOT SUPERSEDE TRAFFIC RULES

**B**OSTON, July 16—In the first test that has been made of the rights of automobilists under the new automobile law that went into effect July 1, the court to-day decided against the motorist. One of the questions that arose immediately after the law became effective was whether it repealed the Boston street traffic regulations so far as they relate to motor vehicles. These regulations contain various restrictions as to vehicles in general: that they shall go only one way in certain streets, that they shall stop only in certain places and for a limited period of time, that they must keep to the right, etc.

Section 17 of the automobile law provides that "No ordinance, by-law or regulation now in force in any city or town or in any park or upon its ways which regulates the speed at which motor vehicles shall be run upon its ways or which excludes such vehicles therefrom or which governs or restricts the use of such vehicles shall hereafter have any force or effect." Believing, he claims, that this part of the law annulled the street traffic regulations Samuel D. Fisher, of Cambridge, attempted to drive in

the wrong direction in State street, was arrested, and his case came up to-day in the municipal court before Judge Parmenter.

In the trial, counsel for the defendant contended that there was no rule in effect, as the traffic rule had been annulled by the automobile law. Counsel for the city held that it was the intent of the Legislature in the section in question to do away only with regulations relating to automobiles, and that the traffic rules, which govern the use of the streets by all vehicles, are not within the classification referred to in the automobile law. In announcing his decision Judge Parmenter said: "It seems to me that the best interpretation of this statute is that it repeals only such special regulations as relate to the use of automobiles and does not repeal general traffic regulations." The case will be carried to the upper court.

The new Boston park auto rules have been approved by the Highway Commission. They exclude autos from some park roads and state what roadways shall be used in certain parts of the park system, but contain no speed limits.

### THIRTY-ONE STATES NOW IN A. A. A.

While the A. A. A. officials and directors were in Detroit a week ago to witness the start of the Glidden Tour its membership was increased at the monthly meeting of the executive committee by the election of the Wyoming State Automobile Association, making the thirty-first affiliated state body in the National organization. President Lewis R. Speare, of Boston; Secretary Frederick H. Elliott and several other officials returned last week and expressed themselves as highly gratified at the enthusiasm displayed in the A. A. A.'s good roads movement, including the plans for the coming convention in Cleveland and the National Stock Car races to be held in Lowell, Mass., on Labor Day. At the meeting of the executive committee the membership of the good roads board was increased by the election of James R. Jackson, of Grand Rapids, Mich., and Col. W. D. Sohler, of the Mass. State highway commission.

President Lewis R. Speare, of Boston, presided at the meeting, there being in attendance Third Vice-President Frank M. Joyce, of Minneapolis, Minn.; George C. Diehl, of Buffalo, chairman of Good Roads Board; W. W. Brown, president of Automobile Club of Vermont; C. L. Bonifield, president of Automobile Club of Cincinnati; J. O. Heinze, president of Lowell (Mass.) Automobile Club; Percy F. Black, president of Montgomery (Ala.) Automobile Association; Edwin S. George, ex-president Michigan State Automobile Association; A. G. Batchelder, of New York, and Frederick H. Elliott, of New York, secretary.

### MILWAUKEE CONTEMPLATES AN ORDINANCE

**MILWAUKEE, Wis., July 19**—The Common Council of this city is working on an ordinance designed to supplement the State laws regulating automobiles. One of the regulations proposed is that cars come to a full stop when a street car ahead stops to receive or discharge passengers, and another is to establish a speed limit of eight miles an hour in the downtown district. Members of the Milwaukee Automobile Club will watch developments carefully, as there are a number of Councilmen who have no love for automobiles.

### WISCONSINITES SLOW IN RE-REGISTERING

**MADISON, Wis., July 19**—The Wisconsin Secretary of State reports that only a small percentage of owners have complied with the new registration law increasing the fee to \$2 at this time. However, penalties will not be exacted until 90 days after the publication of the law, June 19.

### REGISTRATIONS INCREASING IN OHIO

**COLUMBUS, O., July 17**—By the report of the State registrar of automobiles, Fred H. Caley, the receipts of the department for the month ending June 15 amounted to \$21,129. The total receipts since the State automobile law became operative have been \$120,101.23. During the month, new registrations issued numbered 1,775 and manufacturers and dealers to the number of 25 were registered. Chauffeurs' licenses issued numbered 65. Renewals of registration numbered 2,175 and renewals of dealers and manufacturers numbered 48.

State Registrar Fred H. Caley has announced that the system in vogue in Pennsylvania of distributing numbers will be followed in Ohio next year. The system provides that numbers will be distributed in the order of the receipt of the application and no attention will be paid to requests for freak numbers, numbers corresponding to the date of birth, marriage, etc. But an exception is made that all applications received previous to December 1 will have the privilege of reserving the present year's number for 1910.

### NEW NUTMEG LAW UP TO GOVERNOR

**HARTFORD, CONN., July 19**—As yet the protests of the circular letter issued by the Connecticut Automobile Association against the new automobile law seem to have no direct effect. The much-talked-of measure has reached the stage where the signature of the chief executive will make or break it and all are wondering just what the governor will do about it. It is a common impression that a veto would be overturned, for the Legislature has put in a lot of time on the measure. However, no one would mind it at all if the 1907 measure were to live another two years.

### HEAVY JULY REGISTRATION IN INDIANA

Figures published by the Secretary of State of Indiana show that in the three months from April 1 to July 1 there were 2,591 automobile licenses issued during that time, and during the first eight days of July 249 licenses were issued, an average of 31 a day. A very large number of machines are being sold to farmers, especially to those who have retired from active farm work and moved into towns.

### HARTFORD CLUB ISSUES YEAR BOOK

**HARTFORD, CONN., July 12**—The year book of the Automobile Club of Hartford has just been issued by Secretary A. G. Hinckley. It contains a fund of information, including the constitution and by-laws of the organization, its membership list, etc.



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## INTERNATIONAL TOURING RECIPROCITY

Should the proposal to have all the countries of Europe join in a plan of international licensing really be carried out, the broadening influence of automobile traffic will have scored a remarkable triumph. Yet it is no mean triumph that such a thing should ever have been proposed. The officials of France and Germany are commonly supposed to be so bound, wreathed and entangled in red tape as to have long ago lost all power of acting or even thinking for themselves. However, a German official politely suggests to a French official that a simple little agreement of reciprocity would be mutually advantageous, and as France is the leader in the automobile industry, would France be pleased to make the suggestion to other countries? And the French official courteously replies that he will consider the matter; and he does consider it, to such good effect that it really seems as if such an agreement might be made.

Briefly, the proposal is that all European countries shall recognize each other's driving licenses and registrations, and that they shall recognize each other's customs' deposit certificates, provided the amount of the deposit is sufficient to cover the duty in the country in question. Thus an American tourist landing in England or France could pass one examination, receive one license tag, pay one customs deposit, and then proceed to travel anywhere in Europe without further inconvenience or red tape. Only one who has tried touring on the present plan can

appreciate the immense amount of inconvenience and red tape now required at each frontier.

The countries of Europe have different languages, different tariff laws and different rulers. Our States have the same language, the same ruler and no tariffs to contend with. If Europe can have international licensing, why cannot we have interstate licensing? Governor Fort of New Jersey, who is rapidly redeeming that State's reputation, suggested a reciprocity agreement between Pennsylvania, New Jersey, New York and the New England States. As a starting wedge, the proposal is excellent, and its fulfillment would be an inestimable boon to all the automobilists of those States, not to mention their other inhabitants. Such a movement, too, would doubtless spread to other States until all that possessed any considerable number of automobiles would be included. But the reciprocity should not be dependent on the whim of an often prejudiced and partisan State legislature. What this country needs and must have is a national registration law.



## REMEDIES FOR SKIDDING OR SIDE SLIP

In the rush of quantity production, the American manufacturer has little or no time to develop new ideas in automobile construction, hence it has come about that the cars on this side of the water carry with them little of that originality which is so prized on the other side.

As a single instance illustrating the point, the English constructors are now much agitated over the matter of side slip, or, as it is more usually called, skidding. In search for a preventive for this, a number of devices have been developed which seem to merit more than passing attention. Some experimentation was done with tires having a surface calculated to offset the slippery nature of pavements, but the only result of this was to develop the so-called Liversidge tire for heavy trucks.

Another scheme took into account the fact that side slip did not take place at all times but only occasionally. This, then, opened up a field for a device which could be brought into play at the driver's own time and was normally out of engagement. Since the slipping never takes place except under conditions which may be predetermined, it is both feasible and reasonable. This form worked out in the Newcomb attachment, which is attached to the rear axle and by means of a lever at the driver's side is dropped down into contact with the pavement or road surface by a simple movement of the hand.

Still beyond this, were the possibilities opened up by front driving. As against this solution, the fact looms up large that this does introduce many mechanical complications which are objectionable, in fact in the ordinary case more so than the skidding, since the complicated construction is always present, the side slip, very seldom.

This then was not a favored solution, and once more investigators turned away. Next and latest in point of actual construction is the matter of front brakes. These have been taken up, not by one or two builders, but by a large number, including many of the most prominent firms. The recognition of this form of a preventive by the larger firms following close upon extensive tests, leads one to think that there must be a good deal in it. The outcome of much agitation in this direction was a car especially built to overcome the objectionable feature.



## REEVES PREDICTS WONDERFUL BUSINESS YEAR IN 1910

THAT automobiles are standard and that few changes will be made in the models for 1910, is the statement made by Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, on his return to New York at the end of last week from the last of three trips occupying about six weeks, that took him into sixty-one of America's leading motor car factories. He repeats his recent estimate of at least 200,000 as the 1910 production, and says that while there will be no reduction in the price of the standard models, there will be more given in a car next year than ever before. In other words, while the price of materials has been advancing, the cost of manufacture is being reduced and the makers are making refinements that will bring out better cars without advancing prices.

A general review of the plans in automobiles for 1910 would indicate that improvements for next year will be confined almost entirely to the refinement of the present successful types. In the opinion of Mr. Reeves, the time which has long been wished for when motor cars would be standard has about arrived.

"In a general way," said Mr. Reeves, "I would say that the 1910 motor car will show a decided tendency toward standardization. The wonderful advances in gas engines during the past ten years has brought the present type of automobile almost to the perfection point, and improvements now must be almost entirely in the matter of details. While there will be some changes of models and designs by a few makers, the inclination is to improve on the present satisfactory type of motor. The future may see some radical changes in car construction, but certainly not for a couple of years. The 1910 car will see those refinements which make for silence and simplicity in operation, increased power without increasing the size of motors, more pleasing design, greater riding comfort and lower maintenance cost.

"One of the most important changes will be the use of a longer stroke in motors. A number of makers are using the same size of cylinder whether they be for a four or six model, which makes for standardization. Magnetos are now in universal use, some makers not even supplying a battery. High-tension and low-tension magnetos are used, each having its followers.

"Among other changes for next year will be larger wheels and tires, a longer wheelbase, especially in the moderate priced cars; the casting of cylinders in pairs and sometimes en bloc; the use of shaft drive, except on a small number of very large cars or buggyabouts; the increasing use of the thermo-siphon system of cooling, and the adoption of a direct drive on third speed in transmissions where four speeds are supplied.

"Most radical of all in the way of changes relates to the placing of the steering wheel on the left-hand side, which will be followed by two of the biggest producers next year and a number of smaller ones.

"In some cases motors are being cast with the exhaust pipe included. One maker will have only one pipe running from the carburetor to the motor, doing away with the manifold. Carburetors have been refined and studied with a view of securing more power and greater distance than heretofore.

"The design of bodies will be given more attention next year and the lines of the cars generally will be more pleasing to the eye. The use of ball or roller bearings is universal. While the four-cylinder motor continues to be the most popular, a number of big cars, and especially those of high power, will be equipped with six-cylinder motors. While a number of the small makers have given up the six-cylinder idea, there has been an increased demand for six-cylinder cars among the big car makers, especially those who turn out the high priced machines.

"It is a revelation to visit those factories which constitute the membership of the American Motor Car Manufacturers' Association, to see the plans, the preparations, the new buildings and

the many other things that not alone indicate a great production, but a confidence in the business and the buying ability of the American public, which should result in a record year in 1910.

"While in the West I traveled a couple of days with the Glidden tourists, and I believe that the car which evolves a winner of that strenuous test can truthfully be called the champion touring car of America. A trip each day of from 150 to 200 miles over good, bad and very bad roads, at an average speed of close to twenty miles an hour, requires a car of more than ordinary quality to stand the pommeling. The tightening of a nut or the tying up of a broken fender involves a penalty which kills a perfect score, the gaining of which is the ambition of everyone. Cars that make even a fair showing in that test must be considered by the American public as well worth buying.

"As the hub of the automobile industry, Detroit certainly did itself proud in the line of entertaining the Glidden tourists. They were open-hearted in their care and reception of all who visited the city to see the start, and certainly the Dealers' Association, its officers and the automobile people in Detroit generally have set an example in the line of whole-soul entertaining that may be the aim in future motor events."

On the last of his three trips to the factories comprising the membership of the American Motor Car Manufacturers' Association, Mr. Reeves visited the concerns in Michigan and Wisconsin, which completed his round of the companies holding membership in the big organization of makers. More than sixty factories were included in his six weeks of travel. In speaking of his trip, Mr. Reeves said:

While I expected to see a whirl of industry at the Ford plant in Detroit, I was not prepared for the great work which the big organization there is doing. So busy have they been turning out cars that no effort has been made to move into the new plant on Woodward avenue, and it is believed now that an entire new equipment will be put into that place instead of moving anything from the old factory. The Model T cars are going through at a rate that would cheer the heart of any agent, the record being 1,954 cars during the month of June. They are now being completed at the rate of 450 to 500 a week, with the agents, of course, clamoring as usual for more cars. Henry Ford is famed as a producer, and he is holding up his reputation in every way. He was well pleased with the victory of the Ford car in the Seattle contest, and declares that such contests do more to prove the reliability and strength of a motor car than any other kind of a contest. The foreign business is on the increase, and James Couzens, the secretary and treasurer, will leave for Europe the latter part of this month to care for matters over there.

At the Brush runabout plant, Frank Briscoe, the president, stated that the business had so far outgrown the factory that a new plant would be put up, the dimensions of which will be 371x150, which, he says, will be the biggest single factory in the automobile trade. The present plant has been working 21 hours a day for months, both in the place on Woodward avenue and at the addition on the Grand Trunk Railroad. They will make about 2,000 of the little Brush runabouts this year, and plan to double next year. There will be very few changes on the car for 1910, the present model having proven satisfactory in every way. In connection with the Briscoe Manufacturing Company, which makes radiators, Mr. Briscoe told me that he bought half a million pounds of copper when the price was only a little above 12 cents, which puts him in a fine position for low manufacturing cost in the future. The Brush plant has ordered \$30,000 worth of new machinery.

F. W. Haines, the manager of the Regal Motor Car Company, is planning a new addition to the Detroit plant which will be 217 x 54, four stories, ready for occupancy by September 1. The car has been eminently satisfactory this year, and will have only a general refinement for 1910. The body will be changed somewhat, and the wheelbase lengthened. The car has a sliding gear transmission on the rear axle, and selling at \$1,250, with a 30-horsepower motor and magneto, is considered excellent value. They are now turning out 18 engines a day, and have been working day and night since last November.

Another concern in Detroit which is making rapid headway is the Grabowsky Power Wagon Company, of which Max Grabowsky is president, and John Baker, secretary. The company has doubled its capital so that it is now \$300,000, and is negotiating for a new factory site, although the present place on Champlain Street will

be retained. It builds trucks of 30-35 horsepower, and also three-ton trucks of 40-45 horsepower. The detachable power plant has proven to be a happy thought, permitting a concern, by having an extra power plant, to keep all their trucks in operation. The Regal Motor Car Company recently bought a Grabowsky truck for use around its factory.

At the Hupp Motor Car Company, plans and preparations are under way for a record production next year to supply additional territory. During the past year the little Hupmobile runabout has been unusually successful in Detroit and other cities, but a comparatively limited production has prevented its appearing as strongly in the East as it will next year. The runabout sells at \$850 with Bosch magneto.

The city of Pontiac, which is about 26 miles from Detroit, is fast becoming an important motor car center, having four prominent factories. The Rapid Motor Vehicle Company there has made gigantic strides during the past year or two. Morris Grabowsky, the secretary, showed me plans for a new addition, 670 x 60, and another one, 300 x 60. The company will install \$100,000 worth of machinery during the next four months. It is making 30-horsepower, two-cylinder trucks of 1 ton and 1 1-2 tons, with 40 to 60-horsepower, four-cylinder motors in trucks of three and five tons. They had 25 trucks in the Detroit parade. H. G. Hamilton, the president of the company, said they now have 22 acres of ground for factory purposes. The Rapid people are now the acknowledged leaders in the commercial vehicle line. Incidentally, Mr. Hamilton has also been elected treasurer, and has acquired an interest in the Cartercar Company.

The Welch Motor Car Company is now interested with the General Motors Company, although the same management continues. A. R. Welch and Mr. Pack are planning to continue their big Welch cars next year, but in addition will organize the Welch Company of Detroit, that will turn out a four-cylinder car selling at \$3,200. The new company will occupy the plant in Detroit formerly used by the Oldsmobile Company. The Welch cars that have very properly grown famous for their speed and durability, will, for 1910, be a four-cylinder car of 50 horsepower; a six-cylinder car of 75 horsepower, and a large four-cylinder car of 70 horsepower.

The Oakland Motor Car Company is another plant that is included in the General Motors Company, but J. W. Murphy continues to be the guiding spirit. The company has had an unusually successful year, both in competitions, proving the worth of the car, and in general sales. Plans are under way for a production of 3,000 cars for next year, the line including a 40-horsepower machine, fully equipped, at \$1,700, and a two-cylinder car. There will be few changes in general construction for next year. The company has over 200,000 square feet of floor space, and is well equipped for a big production. The factory was well pleased with the victory of the Oakland in the Cincinnati hill climb, when it captured the free-for-all and two other prizes.

The Cartercar Company is now settled in its new plant at Pontiac, taking over the factory formerly occupied by the Pontiac Buggy Company. R. A. Palmer, the secretary, with his associates, have laid out an ideal factory for accurate and rapid production. The friction drive fills a unique position in motordom, being in demand by a large number of people owing to its simplicity and ease of operation. So successful has it been during the past few years that there are few things to change for the 1910 product. There will be seven models for next year, although only three different types of chassis. The two-cylinder opposed motor will be continued in the taxicab and in a roadster, as well as in a delivery wagon and coupe. The company will also build a four-cylinder touring car of 30-35 horsepower, listing at \$1,600, and a very racy looking runabout at \$1,000. There will be a big advance in the production next year that should make the Cartercar agents contented in mind as well as in purse.

One never goes to the Reo plant in Lansing, Mich., without expecting some great things, and there was no exception on my visit this year. I don't know of any other factory in this country that has scored any better than Reo in manufacturing motor cars, taking into consideration the money made by the company itself, and those identified with it, and by the agents, to say nothing of the satisfaction of the users. The company recently closed a deal with R. M. Owen and Company that disposed of their product for the next five years. The factory system is as near perfect as men of the ability of Mr. Olds can make it. E. F. Peer, the secretary, conducted me through the factory, which seemed an endless journey among machines and other conditions that make for a big production. It is planned to turn out 10,000 cars for 1910, a limited number being of the present two-cylinder type which continue to be in demand among agents, but most of the cars being the new four cylinders. The cylinders are 4 x 4 1-2, cast in pairs. The steering control is on the left-hand side. The car has an I-beam front axle, overhead valves, 108-inch wheelbase, selective type of transmission, high-tension magneto, and multiple disc clutch. The company owns four square blocks of ground, and is fast covering them with new buildings. Three new buildings are going up, one of them a four-story building, 65 x 125; another of three stories,

65 x 100, and a third with three floors, 100 x 200. Robert Reushaw, well-known to all those who were in the bicycle business at the time he was connected with the Pope Company, represents R. M. Owen at the factory, and looks after the agents. Mr. Olds is now on his new 97-foot cruising yacht the "Reomar," having sailed from New York on Saturday for a trip with his family through the Thousand Islands. Aside from his presidency of the Reo Company, Mr. Olds is president of the Capitol National Bank of Lansing, the Michigan Screw Company, the Atlas Drop Forge Company, and a director in a dozen or more other institutions.

At Grand Rapids, Walter Austin and his father are enlarging their plant for the manufacture of the Austin car, which has an exclusive trade and which, for that reason, has not been turned out in very large numbers. The car's brown and cream color body is well known throughout the country, and the makers cater to those folks who only wish the very best in design and construction. This year, in addition to their high-powered cars, the Austin people will make a five-passenger car at \$3,000 with complete equipment. It will be known as the "Little Six" and will have a 4 3-8 x 5 1-4 motor, with a rating of 45-60 horsepower. It should be an excellent seller. The company will only make six-cylinder cars next year, the other models being a 50-75-horsepower car at \$4,500, and the luxurious five or seven-passenger job with a six-cylinder motor of 60-90 horsepower, the cylinders being 5 1-2 x 5 1-2. This car is of 140-inch wheelbase, with four speeds, and all other things that might be expected in a car selling at \$6,000.

As a leader in what is known as the motor buggy business, the Holman Company, of Chicago, might naturally be expected to have great plans for next year. Mr. Hildreth told me that the factory at Thirty-sixth and Morgan Streets has been working day and night, turning out the present model, and will have the 1910 cars ready for delivery on September 1. There will be only a general refinement of the present successful cars with the prices ranging from \$500 to \$1,000. The product has been pretty evenly distributed, the eastern trade and the expert trade increasing during the past year. The Holman Company has been making automobiles for eight years, and have turned out more cars of that type than any other maker.

More changes have taken place at the Mitchell Motor Car Company's plant at Racine, Wis., than at any other plant I visited during the past six weeks. All the wooden buildings have been removed, and in their place are reinforced concrete structures of the most modern kind. A new office building, 125 x 120, is now under way. It will have two floors with a garage in the basement. J. W. Gilson and J. W. Bate were at the factory last week, while President Lewis and Secretary Rogers were on the coast attending the annual agents' jubilee. Judging from my talk with Mr. Gilson, the Bate plan for economical manufacture has worked out to perfection. The cylinders on all models are the same size so they can be placed in four-cylinder or a six-cylinder car. This means a standardization of connecting rods and pistons, and should result in a great saving in costs and in the securing of parts by agents. The cylinders are cast in pairs. Three models will be made next year—a 100-inch runabout, a touring car of four cylinders, and a seven-passenger car of six cylinders. The cylinders in all cases will be 4 1-4 x 5, and a magneto will be regular equipment. The standard colors will be dark blue and maroon, with buff running gear. The lines of the new cars are radically different from this year, and every possible improvement that could be made on this year's type has been cared for. The motor with its overhead valves is a very quiet running affair and among other details are a tubular torsion bar, straight line drive, single universal joint, lower hanging of the body and floating type of rear axle on all cars. Among the new buildings put up is one of 100 x 100 now being used for a motor assembly, while in construction is a new concrete affair 250 x 250 with a saw-tooth roof; another 450 x 250 with a duplicate to follow. Certainly the Mitchell Company will be equipped to carry out its production of 6,000 cars.

The Pierce Motor Company has been reorganized and next year will produce the "Pierce Thirty" and the "Pierce Forty." The price of the car has not been settled, but the smaller one will sell for less than \$1,700 with the large car at something like \$2,250. It will be a conventional car so far as general construction is concerned, but will have the Pierce motor which has been so successful in marine work, there being 20,000 Pierce motor boats in use now. The president of the new Pierce Motor Company is C. L. McIntosh, who is treasurer and part owner of the J. I. Case Threshing Machine Company, one of the biggest manufacturing concerns in the West. The vice-president is Fred Robinson; secretary, John Peebles; treasurer, C. J. McIntosh, while J. G. Cowling, for ten years with the Case Company, is general manager. A. J. Pierce, who has been making automobiles since 1893, continues as general superintendent.

The Jackson Automobile Company is preparing for a big production as a result of the new additions to their factories at Jackson, Mich. Two new buildings are in the course of erection, each 240 x 60 and four stories high. An addition is being built to the motor plant, 200 x 60, three stories. Charles Lewis, G. A. Matthews, and F. L. Holmes, of the company, were responsible for



the hospitable reception given the Glidden tourists by the Jackson Chamber of Commerce when they passed through that city en route for Kalamazoo. The Jackson line next year will consist of three four-cylinder models, one selling at \$2,250; another at \$1,700, and a 20-horsepower car at \$1,250. The changes for next year will include larger wheels and tires, and a longer wheelbase, other than which the Jackson construction will be continued. Mr. Matthews told me that the Fuller Buggy Company, which he owns, will turn out a motor buggy for 1910.

Before reaching New York, I visited the plant of the Maxwell-Briscoe Motor Company at Tarrytown, which is one of its big factories and the headquarters of that concern. Benjamin Briscoe's leadership in motor affairs generally is not to be wondered at when his success with the Maxwell-Briscoe Motor Company is considered. The manufacturing is down to the finest point, and a clean cut system generally prevails in all the departments. The company now owns all the real estate at Kingsland Point, and has covered it with factory buildings. They have also bought the old factory of the Rand Power Company in Tarrytown, and only recently purchased another big factory near Providence, R. I. These are in addition to the big plant at Newcastle, Ind. By their method of distribution, which is original with Mr. Briscoe, the company is able to care for all its agents on a fair basis. The percentage system prevails, and every agent knows just how many cars per month he is going to receive. The selling organization of the Maxwell-Briscoe Company is one of the best in the country.

The little \$500 car has been a great success, and will be continued next year to the tune of many thousands, while great things are expected of the new Model Q, equipped with a four-cylinder, 20-horsepower motor, embodying all the well-known Maxwell features, and yet sell for \$850. Some other sensational models are planned for 1910, but in all of them the John D. Maxwell ideas, such as three-point suspension, thermo-syphon cooling, and unit engine clutch, and transmission construction will prevail. The company plans to make 18,000 to 20,000 cars in its four factories next year.

Great success has attended the efforts of the Atlas Motor Car Company at Springfield, Mass., in turning out their two-cycle motors. They are making heavy inroads on the taxicab trade in New York, the two-cycle, two-cylinder motor of 20 horsepower giving unexcelled service even in the hands of hard drivers. The New York branch sold 148 of these cabs during the past four months. The company also makes a three-cylinder, 30-horsepower touring car, and a six-cylinder, 50-horsepower runabout that has exceptional speed. The policy and line for 1910 has not been settled by Harry A. Knox and W. G. Morse, but it is not expected that there will be any radical changes from the satisfactory type of this year. The new addition to the factory was completed about a month ago, giving the needed additional facilities for making the 1910 cars.

Generally speaking, I found the entire trade in exceptionally fine shape, and full of optimism on 1910 as a record year for the sale of automobiles.

## PUTTING STRENGTH AND ENDURING QUALITIES INTO THE AUTO

By HENRY SOUTHER, ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS.

IT is probable that there has never been a period of such rapid development in the metal trades as has occurred in connection with the automobile industry. The work was largely started and carried through by those pioneer automobile manufacturers constituting the Association of Licensed Automobile Manufacturers.

In America, the tremendous importance of heat treatment of steel has been grasped and the principles involved therein carried to an ultimate conclusion. Intelligent heat treatment is quite as essential as the quality of steel; a commonplace steel may be given very good physical qualities by proper heat treatment, and the best of steel can be ruined by lack of it. There must be thoroughness in the various operations of annealing, hardening and tempering. Treatment carried on with sufficient care makes uniformity of product possible.

The difference between ordinary material and the best of material is a great one. For example, the elastic limit of ordinary steel is 40,000 pounds to the square inch, with, say, a reduction of area of 50 per cent. Properly heat-treated, nickel steel will have an elastic limit of two or two and one-half times this figure, and yet have 50 per cent. area reduction or more.

Brittleness does not follow intelligent heat treatment; and the enduring quality is increased in greater ratio than the elastic limit. Consequently crystallization, fatigue or whatever the cause of breakage we are to prevent, is called, is less likely in a properly heat-treated and tempered material than in an annealed and soft specimen. This having been discovered in the laboratory and established in actual practice, is now accepted by the metallurgical world, reversing previous general belief.

Another commonly accepted belief has been that the stronger a piece of steel is the stiffer it is; for example, that if one metal is twice as strong as another, it will bend only half as much under a given weight. But actual tests have shown that a chrome nickel steel, having an elastic limit of 150,000 or more pounds per square inch, bends under a given load the same amount as a carbon steel. This is true as long as the load is within the elastic limit of the weaker material.

The elastic limit of a well-tempered piece of spring steel is above 150,000 pounds per square inch. If a spring be made of soft steel and not loaded beyond its elastic limit, it would return every time to its original shape, but the deflection would not be sufficient to make a good spring; it would be hardly noticeable. The automobile industry has forced the spring maker to depart from his old materials and methods.

Assume that a good .20 carbon steel has been used with satisfaction for a year or two on a given design of crankshaft,

neither bending nor breaking through long-continued use. Assume the bearing surfaces are as small in area as possible to run properly. A crankshaft of highly treated chrome nickel steel, having an elastic limit four or five times as high as the .20 carbon material would be no stiffer, but would have increased life and last much longer.

Really sound knowledge as to steel has been spreading fast among the intelligent manufacturers, who use much discrimination in separating the false from the good. They have established testing laboratories and examine for themselves what materials they buy. There are, perhaps, a dozen first-class grades of steel in the market (and America has a market at least as good as any in the world, with, of course, always the option of buying abroad for any real or fancied reason) suitable for the highest class of automobile construction.

Bronze is still an important factor. Here the casting method is all important.

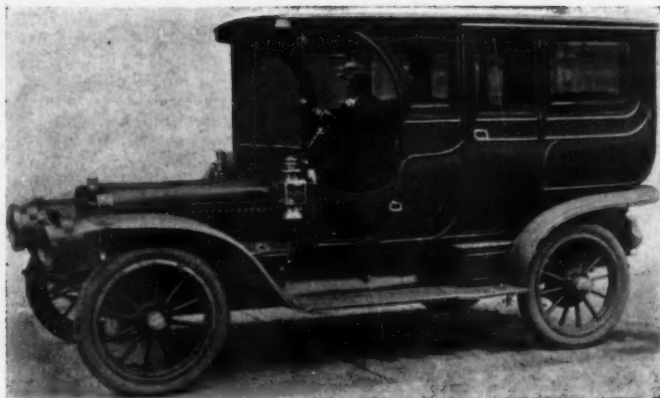
Aluminum alloys are of great interest.

Where any form of plain journal is used the bearing metal question seems to have settled down, to a high grade tin-antimony alloy, running against a soft shaft; a hardened shaft running on a good phosphor-bronze; or a soft shaft running on a white bronze. All of these combinations are giving good results.

The larger part of the expense of an automobile engine cylinder is in the finishing labor, and not in the iron. In the foundries there are many complex conditions arising from what a layman would think trifling matters, in the production of first-class, sound cylinders.

## QUAKER CITY APPOINTS ITS SHOW COMMITTEE

PHILADELPHIA, July 19—The initial steps were taken last week by President J. A. Wister, of the Philadelphia Automobile Trade Association, in preparing for next winter's show. He appointed W. J. Foss, of the Pierce-Arrow agency, and James L. Gibney, who represents Continental and Gibney tires in the Quaker City, a committee to run the exhibition, which will be held between the New York and Chicago shows, if that week can be secured—possibly from Wednesday to Wednesday, as was the case last year. Secretary J. H. Beck, without whom a Philadelphia show could hardly be a success, will, as before, look after the details and manage the show proper. At this writing, it seems as if the promoters would again be compelled to labor under the handicap of a hall about 50 per cent short of the space requirements, the local armories being about the only available buildings in sight.



G. W. Butler and Winton That Won 1909 Upkeep Contest

### WINNERS ANNOUNCED IN WINTON CONTEST

The \$1,000 first prize in the annual Winton upkeep contest was won by G. W. Butler, who drove his car 17,003 miles without spending a single cent for repairs. Butler's record is all the more remarkable because his car was also a prize winner in last year's contest, when it had a score of 5,155 miles without repairs, and also because the car carries a limousine body. During the contest, the competing chauffeurs were required to file monthly reports, attested by their employers, and at the end of the contest both chauffeurs and employers were asked for sworn affidavits. The list of prize winners follows:

First prize, \$1,000—G. W. Butler, chauffeur for J. E. Clenny, Chicago; 17,003 miles, no expense.  
 Second prize, \$500—J. J. Boyce, chauffeur for Isaac Bacharach, Atlantic City, N. J.; 11,000 miles, expense 30 cents.  
 Third prize, \$250—W. L. Losee, chauffeur for G. W. Frost, Verona, N. J.; 10,595 miles, no expense.  
 Fourth prize, \$150—J. W. Tracy, chauffeur for T. N. Barnsdale, Pittsburg; 15,669 miles, expense \$81.15.

Six other prizes of \$100 each were awarded to Arthur Donovan, New York; L. Avenmarg, Cleveland; William Richards, New York; John Wilson, Cleveland; Miles Fellers, Cleveland, and Harry Rosander, Chicago.

The total mileage of the prize winners was 118,503 miles, and their total repair expense \$127.30, which makes the average expense per car per 1,000 miles \$1.07.

### MAXWELL-BRISCOE AGENTS' CONVENTION

NEWCASTLE, IND., July 19—The 1909 convention of the district supervisors and managers of the Maxwell-Briscoe Motor Company went into session at this city last week. Most of the delegates arrived from Detroit, where they had witnessed the start of the Glidden tour, on a special train, accompanied by the Maxwell band. The first day's session included the discussion of the

selling policy of the company and other matters of interest to the closer family circle of the Maxwell organization. Afterward the Maxwell men were the guests of the city, which had prepared an elaborate entertainment at the Country Club. Fireworks, a band concert and a general jollification at Maxwell Park were attended by some five thousand people.

Among the delegates were Benjamin Briscoe, J. D. Maxwell, F. D. Dorman, A. B. Barkman, A. R. Gormully, Ernest Coler and J. D. Moore, of the company's home office; Col. K. C. Pardee, New York City; J. M. Austin, Atlanta, Ga.; C. E. Munroe, Buffalo; A. I. McLeod and Bob Davis, Detroit; F. J. Linz, San Francisco; Thos. Dunn, Pittsburgh; F. J. Tyler, Boston; C. G. Bleasdale, Cleveland; B. E. Stimson, Minneapolis, Minn.; J. I. Handley and R. I. Creek, Chicago; W. S. Hathaway, Kansas City, Mo.; Gabriel Chier, Detroit; T. E. Lester, Dallas, Tex.; H. E. Rooklidge, Kansas City, Mo.; F. R. Tate, St. Louis; E. E. Cohen, Portland, Ore.; M. A. Stacksteder, Dallas, Tex.; C. J. Simons, St. Louis.

### SOUTHERN SHOW WILL HAVE OVERFLOW

ATLANTA, GA., July 20—They are going to exhibit automobiles out in the street at the big show here in November. General Manager S. A. Miles, of the National Association of Automobile Manufacturers, has been here looking over the ground, and making a scouting trip through and about the Atlanta Auditorium-Armory in search of more space. He expects nearly 100 exhibitors at the coming show, and has space for hardly more than two-thirds of that number. To meet the requirements of the show management Atlanta will turn over one whole block of Courtland street, adjoining the Auditorium, and this space will be roofed over with canvas and a number of exhibits will be placed in the enclosure. In this manner it is possible that most if not all of the intending exhibitors can be accommodated. The people here intend to have a real show at any cost.

### CONVENTION OF AJAX-GRIEB MANAGERS

The branch managers and agents of the Ajax-Grieb Rubber Company will meet at the factory at Trenton, N. J., July 28-31. The representatives from Seattle and San Francisco are already on the way. Together with the more pressing business of the convention those attending will be present at the Brighton Beach 24-hour race.

Dallas, Texas.—The White Steamer Automobile Company has made plans for the erection of a two-story and basement fireproof garage building. It will cost \$50,000, and will be equipped with steam heat, electric light and power and electric elevators.



New Testing Track of the Maxwell-Briscoe Motor Company, Just Completed for the Newcastle, Indiana, Plant



## E-M-F BUYS DE LUXE PLANT—WILL BUILD SMALL CAR

**D**ETROIT, July 19—Million-dollar deals are coming so close together in the local automobile field that they no longer excite more than passing comment, although the changes effected thereby are of widespread importance. Following close on the acquisition by the General Motors Company of the Cadillac Motor Car Company, the price paid being approximately \$4,500,000, comes the announcement that the E-M-F Company has purchased the plant and business of the De Luxe Motor Car Company at Clark and River streets, Detroit. The price paid is not made public, but is in the neighborhood of \$800,000, the plant carrying that amount of insurance and representing a far heavier investment in the way of buildings and machinery. All the land, buildings and machinery are included in the buy as also are patents, drawings, tools and fixtures for making the Car De Luxe, to the manufacture of which the plant has hitherto been exclusively devoted.

The land comprises something over fifteen acres, about half of which is at present covered with modern factory buildings admirably suited to the purpose for which it will be used. Beside the property of the De Luxe Motor Company the E-M-F Company also purchased about four acres additional. This latter lies between the Wabash Railroad tracks and Fort street and adjoins the plant of the Timken Axle Company.

Several other parties had been dickering for the De Luxe plant, which is a valuable one, but Walter E. Flanders, president and general manager of the E-M-F Company, shattered all previous speed records by opening negotiations in the morning

and turning over the cash in the afternoon, closing the deal before others knew what was transpiring.

Coincident with this transfer comes the news that the E-M-F Company will next season put on the market a new car to be known as the Studebaker-Flanders "20," and which will sell for less than \$750, the exact price yet to be determined. The Studebaker-Flanders "20," which will be marketed by the Studebaker Company, now handling the entire E-M-F output, will be a four-cylinder car, 3 5-8-inch bore by 3 3-4-inch stroke, with a 100-inch wheelbase. It will have a sliding gear rear axle transmission, 32-inch wheels, pressed steel frame and the regular equipment will include magneto. It will be made in two styles, a two-passenger runabout and a four-passenger suburban. Twenty-five thousand of these cars will be made during the twelve months beginning January 1 next, according to Mr. Flanders, and to show that the concern means business 150 workmen were rushed from the E-M-F plant over to the new acquisition almost before the ink was dry on the papers closing the deal.

Meanwhile the E-M-F Company is more than doubling the size of its present plant on Piquette avenue, the structures now utilized being increased in height to four stories, an addition 70 x 480 feet, and four stories in height being built to connect the present buildings. The manufacture of De Luxe cars will, it is announced, be continued on a limited scale in the plant just taken over by the E-M-F Company, but the greater part of the plant will be devoted to the new "Twenty."

## SEVERAL BIG DEALS ON IN INDIANAPOLIS, TOO

**I**NDIANAPOLIS, IND., July 19—David M. Parry, for almost thirty years one of the leading carriage manufacturers of the country, has decided to enter the automobile manufacturing field. He has announced plans for a factory to be located in this city to cost about \$100,000, while the company will be capitalized at about \$1,000,000. As a preliminary to entering the auto making business, Mr. Parry resigned as president of the Parry Manufacturing Company a few weeks ago, although he still retains his interests there. The new concern will be known as the Parry Motor Car Company.

Two models, to be known as the Parry, will be manufactured. They will consist of two cylinder and four cylinder models, selling at \$1,250 and \$1,400, respectively. It is Mr. Parry's aim to make his plant the largest of its kind in this city.

The first cars will be ready for the market in September. Machinery is being ordered and plans are under way for the factory buildings, the erection of which will start almost immediately and will be pushed vigorously.

### Popular-Priced Cars by Cole Motor Car Company

Another company recently formed in this city is the Cole Motor Car Company, which will manufacture two popular priced

types of cars. J. J. Cole, the well-known and successful carriage builder, is president of the new company.

The Cole "30" and "20" four-cylinder cars are the result of two years' careful study and experimentation with different types of cars, the present model having been subjected for several months to the most severe road tests that could be devised.

That the car as it now stands is a success is partly due to the fact that Mr. Cole has been able to associate with his company one of the leading mechanical superintendents of the country, who for fifteen years has been connected with leading automobile manufacturers.

The output of the Cole Motor Car Company will be marketed by the Henderson Motor Sales Company, of which Charles P. Henderson, formerly of the Henderson-Hull Company, Savannah, Ga., is vice-president and manager. Mr. Henderson, who is closing his first season in the automobile business, has been connected with the carriage trade for many years.

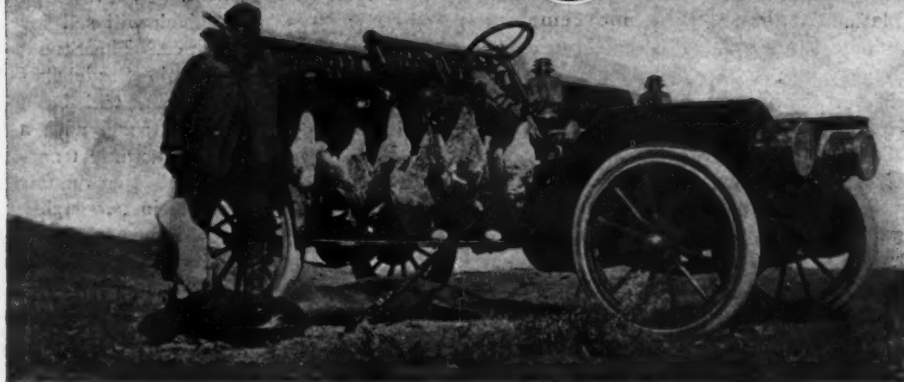
With him actively will be H. C. Lathrop, formerly manager Indiana branch of the A. D. Baker Company, who is secretary and treasurer of the company. Also, as stockholders, Leonard Carter, Jesup, Ga., Dr. A. B. Lathrop, Swanton, Ohio, and J. J. Cole, Indianapolis, Ind.

## DETROIT'S ENVIABLE POSITION IN THE INDUSTRY

**D**ETROIT, July 19—Gliddenites and other visitors during the days preceding the start of the A.A.A. contest were given a new insight into the importance of this city as the center of the automobile industry, being given entree to all the local plants and provided with easy means of reaching any or all of them. Nevertheless, even those who looked over the field cannot fail to be still further impressed with the magnitude of the industry as shown in the figures just compiled by an expert statistician connected with the Detroit Board of Commerce.

These show that Detroit possesses fourteen factories devoted exclusively to the manufacture of automobiles, this statement not taking into account the scores of institutions engaged in making motor car sundries and accessories, chief of which is the immense tire plant of Morgan & Wright. These fourteen factories at the time the canvass was made employed 14,670 men, with an annual payroll of \$9,882,000. The companies are capitalized for \$6,250,000. The value of the output this season will be \$54,325,000, of which \$2,000,000 is represented in exports.

# News in General



Elmer Lovejoy, with His Franklin, Makes Good in a Wild Goose Chase

**A Wild-Goose Chase**—The first automobile ever used in the State of Wyoming, and, it is believed, anywhere west of the Mississippi River, was built by Elmer Lovejoy, of Laramie. He is now president of the Laramie Automobile Club, and in his hours of recreation is a hunter as well as an autoist. Not long ago he set out upon what was literally a wild-goose chase; but he bagged the geese and bore them back home as a proof that this chase, proverbially vain, was not futile and fruitless if undertaken with an automobile. He made a forty-mile run from Laramie through a rough country in an hour and a quarter, and came upon the geese in flight. By running his car under them as they were rising from their feeding grounds he was enabled to bring down seven. Mr. Lovejoy looks back with considerable pride on the old car with which he, in the early days of automobilizing, opened the eyes of the people of Wyoming. His present car, however, is a Franklin of the latest design, which is handled in Laramie by a company of which he is a stockholder.

**Firestone Truck Carried Signs, not Tires**—Published reports that the truck whose accident near Valparaiso, Ind., held up the Glidden Tour nearly an hour was loaded with Firestone tires is hotly denied by H. S. Firestone, who says: "This particular truck was carrying a load of Firestone signs, not tires, from Detroit to Chicago, and had nothing to do with the Glidden Tour. Contesting cars using Firestone tires have never yet felt the need of being accompanied by loads of fresh tires, as Firestone tires are not made that way. For instance, in the New York to Seattle race two of the cars started and finished without carrying any extra tire equipment whatever, and I rather think that this 4,000-mile race was a somewhat stiffer proposition on tires than the Glidden Tour has ever been. We are interested in the Glidden contest only as a car test, and not from a tire standpoint, as the management ruled against making a record of competitive tire service."

**Some Mile-a-Minute Baseball**—The bewhiskered Harlem goats who browse on the rocks and tomato cans in the vicinity of 142d street and Lenox ave-

nue were startled from their dinners last Saturday by a fierce bombardment of three-baggers and home runs. The shrieking of fans—both radiator and flywheel types—filled the air with a weird music, and the voice of the umpire was heard calling "Strike tuh!" The Harlem goats are accustomed to baseball of the usual variety, but the brand dished out by the members of the New York Automobile Trade Baseball Association filled them with awe and trepidation. However, it was only the Thomas Company walloping the Studebaker Company to the tune of 16 to 3. During this slaughter the Republic Rubber Company was battling with the Pierce-Arrowites, whom they finally downed, 8 to 6. Sunday afternoon the Diamond Rubber Company scored a 15 to 1 victory over the Packard team.

**The Horsefly Takes Revenge**—F. M. Hoblitt, of the American Locomotive Company, is responsible for this marvelous tale. "I have seen one coyote stampee 2,000 steers, a mouse an elephant and a bumblebee a gang of harvest hands," says Mr. Hoblitt, "but I never saw a horsefly stop an automobile till yesterday. On the road between Cleveland and Columbus our car suddenly came to a dead stop. All mechanical minds instantly set to work, and it was soon found that the engine was getting no gas. Further investigation showed that in some way a large horsefly had been drawn into the auxiliary air inlet in such a way as to shut off the air and choke the engine to a standstill."

**Atlantic City's Auto Patrol**—Manager "Billy" Taylor, of the Philadelphia branch of the Olds Motor Works, announces the early completion of a patrol wagon which is being built wholly at the branch house for the Atlantic City police department. It will have a 132 1-2-inch wheel-base with a special frame, upon which will be mounted a 4-cylinder, 40-horsepower engine. Manager Taylor has just closed with James S. Boyd to represent the Oldsmobile in Norristown and Montgomery county, Pa., during 1910. The latter is just about finishing the big new Keystone garage, which has been in course of erection for six weeks, and which the contractors have just turned over.

**Novel Factory for Hupmobile**—The Hupp Motor Car Company is just finishing the removal of its equipment and the installation of new machinery in its new factory at Jefferson avenue and Concord street, Detroit. The building is in the shape of a capital U, each of the wings being 350 x 50 feet and the connecting portion 131 x 60 feet. It is one story high, except the part facing Jefferson avenue, where the offices will be located, so that it will not be necessary to pass any of the work from floor to floor. The capacity of the enlarged factory is conservatively designed to be at least 25 cars a day.

**Diamond Tires Distinguished**—Diamond tires played a leading part in two recent events of a widely dissimilar character. On July 10 Hanshue on an Apperson and Dingley on a Chalmers-Detroit won the two road races at Santa Monica, Cal., both using Diamonds. On July 12, at the start of the Glidden tour, Diamond tires were observed on the rims of fourteen of the forty-one starters. One of the contestants on the list was the McIntyre buggyabout, which used a special type of solid tires recently brought out by the Diamond company.

**Gary Company Incorporates**—The Gary Motor Company has just been incorporated in Muskegon, Mich., for the manufacture of automobiles, and, later, of motor trucks. The incorporators are Alfred C. Gary, nephew of Judge Gary, of the steel trust; William L. Simon-ton and James L. Maloney, of Chicago. Work will be commenced within a week on a factory building and it is expected to have the plant in operation October 1.

**Keystone Grease Lubricated Maxwell Non-Stop**—On the recent run of the Maxwell car which recently covered 10,000 miles of road travel without stopping the motor, Keystone grease, the product of the Keystone Lubricating Company, of Philadelphia, was used exclusively. The test covered a period of three weeks, and is a world's record for non-stop runs.

**Record of Locomobile Patrol**—The city authorities of Baltimore have had a Locomobile patrol wagon in service since May 19, and are much satisfied with its performance. The car, in addition to patrol work, responds to all fire and ambulance calls in the central district. It has covered about 2,500 miles and has never been out of commission.

**New Weston-Mott Factory**—The Weston-Mott Company of Flint, Mich., manufacturer of automobile wheels, has nearly completed an addition to its factory, 300 x 165 feet, and is already planning a second addition, 500 x 75 feet, two stories high. The company expects to have 1,600 men on its payroll by October 1.

**Another Puncture-Proof**—The Cleveland Puncture-Proof Tire Company, of Cleveland, was incorporated last week with a capital of \$20,000. The company controls the patents on a tire which, it is claimed, has been found puncture-proof in tests lasting over two years, and will probably erect a factory in Cleveland.

**New Departure Company Busy**—The New Departure Mfg. Co., manufacturer of "Two-in-One" ball bearings, is working its factory at Bristol, Conn., 22 hours daily on day and night shifts to keep up with its orders. Large contracts are reported for bearings to be used in 1910 models.



## IN AND ABOUT THE AGENCIES

**Benz, Atlanta, Ga.**—The Benz Import Company of America has placed the agency for the State of Georgia with the Georgia Motor Car Company, 68-70 Edgewood avenue, Atlanta. G. W. Hanson, well known in Southern auto circles, will give his personal attention to marketing the car.

**White, Baltimore.**—The White Automobile Company has been organized in this city and has bought out the White Garage Company, at Park avenue and Biddle street. The new company will continue as representative of the White steamer, and is planning a modern two-story garage.

**Hudson, Scranton, Pa.**—The Lackawanna Automobile Company, 245 Wyoming avenue, already agent for the Matheson and Chalmers-Detroit, has taken the agency for the Hudson roadster.

## PERSONAL TRADE MENTION

**C. J. Corkhill**, for the past eight years Western sales manager for the Olds Motor Works, recently resigned that position and joined the Apperson Bros. Automobile Company. He will have charge of the sales of the Apperson "Jack Rabbit" in the territory west of the Mississippi River, making his headquarters at Omaha, Neb.

**L. P. Halladay**, formerly general manager of the Streater Motor Car Company, Streater, Ill., has been appointed manager of the automobile department of the Staver Carriage Company of Chicago.

**A. A. Jones**, long identified with the Philadelphia branch of the Ford Motor Company, has succeeded to the local sales managership of the Maxwell branch in the same city.

**C. E. Davis**, superintendent of the American Locomotive Company's plant at Providence, R. I., has resigned his position and gone West.

## DEATH CLAIMS A PIONEER

**George T. Robie**, president and founder of the Excelsior Supply Company, and one of the leading business men of Chicago, died at the Chicago Hospital early Sunday morning. Mr. Robie became ill late in the week and late Saturday night it was found that an operation for appendicitis would be necessary. He was immediately removed from the Hotel Windermere to the hospital, where the operation was performed. Owing to the advanced stage of the trouble, Mr. Robie was unable to survive and passed away early Sunday morning. Mr. Robie was born in Walworth, N. Y., March 26, 1853, and came to Chicago at the age of 20. In 1876 he established the Excelsior Supply Company and soon became a leading dealer in sewing machine supplies and equipment. When the bicycle became prominent Mr. Robie took on bicycle supplies and in a short time became the leader in that line. Following his policy of aggressiveness, as soon as the automobile became an established element, the Excelsior Company assumed the same position in the motor car supply business that it had previously held in the line of sewing machine and bicycle supplies. Mr. Robie held a prominent position in the National Association of Manufacturers and in the Chicago Association

of Commerce. He was one of those who made the recent trip to Seattle. He was a member of the Union League, Chicago Athletic, South Shore and Chicago Automobile Clubs. Mr. Robie also was prominent in Masonic circles. He leaves a widow and one son, Fred C. Robie, who has for some time past been the working head of the Excelsior Supply Company. Funeral services were held on Tuesday at Englewood Masonic Temple.

## TAXICABS AND TRANSIT

**Bagdad, Turkey.**—A company has been formed to run a line of buses from Khanikin, on the Persian frontier, via Bagdad to Kerbela, the sacred city of the Shiite sect of Mohammedans. There are no roads, but the country is perfectly level and smooth and fairly high speed may be maintained.

**New Orleans, La.**—The Taxicab Company of New Orleans, Ltd., has been incorporated with a capital stock of \$125,000. The officers are E. R. Thomas, president; Pierre Crabites, vice-president and treasurer, and L. M. Vitoli, secretary.

**Boston, Mass.**—The Taxa-cab Company, of Boston, has been incorporated to do a general cab and truck business, with a capital stock of \$250,000. The president is R. F. Guild and the treasurer and clerk F. H. Mesmithe, 53 State street.

**Cleveland, O.**—Two auto buses owned by Conger and Langdon have been put in service in the Cleveland park system between Euclid Avenue and Gordon Park, along the East Boulevard. The fare for the twenty-minute ride is 10 cents.

**Memphis, Tenn.**—Local men have incorporated the Corbitt Taxicab Company with \$180,000 capital stock. S. R. Corbitt is president, J. J. Freeman, secretary, W. H. Kyle, treasurer, and Ben Peebles, general manager.

## RECENT PUBLICATIONS

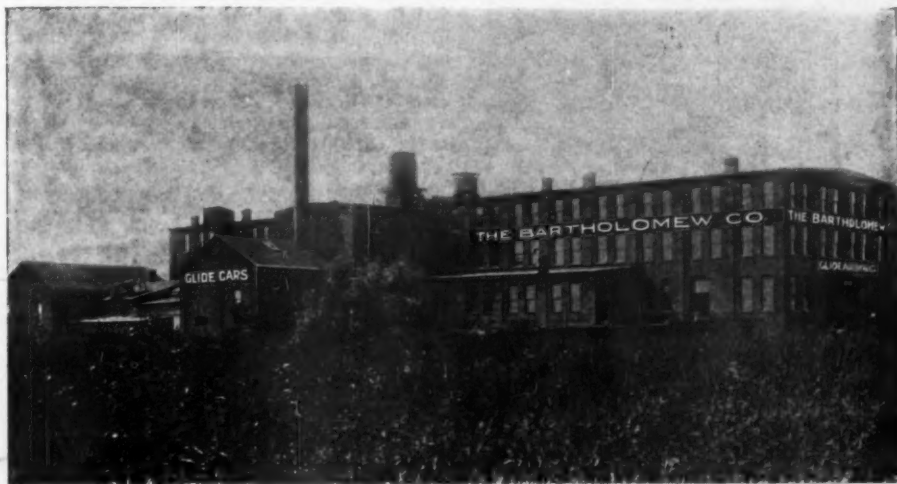
**Packard Motor Car Company, Detroit.**—In thorough keeping with the quality and reputation of its product is the appearance and matter of the catalogue of 1910 Packard cars. In all ways one of the masterpieces of automobile factory publications, the new edition is an advance over the make-up of the general booklets descriptive of the automobile trade. E. Ralph Estep is responsible for the new one, as he has been in the past of the Packard publicity and advertising, and as



New Chicago Agency of the Renault

usual he has succeeded in publishing one of the neatest, most conservative and pleasing editions of the year. The binding is in heavy gray card, and the stock is of exceptionally heavy carded paper, with the typography and illustrations in harmony. There is no color used, as has been prominent heretofore, the entire appearance being of white and gray, the latter accentuated by a grayish border. Packard Thirty and Packard Eighteen are illustrated in many full and part-page cuts, in all body styles—touring cars, roadsters, close-coupled, landaulets, limousines and a newcomer called the pheton. Different tops give another series, intermingled with the straight and familiar types. Birds-eye views show the seating capacities and arrangements of the various bodies, while three-quarter approaches indicate the methods of control, the fender systems, and many other points of interest to the prospective customer. The Packard truck, an important member of the family, is also given detailed attention of the same quality as that bestowed so liberally upon the pleasure vehicles. Chassis construction is taken up at length, with line cuts of the completed cars and of the various assemblies, accompanied by accurate notes. The reader is not bothered by the matter of prices, the most evident part of some makers' catalogues, and is apt to be accordingly more interested. Tables near the rear cover contain the selling price of all models, with the different body or top extras, and the specifications.

**Westinghouse Electric Motors.**—The Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has issued a handsomely printed little booklet describing the application of its line of small motors to varied uses in office, store and shop. From it many useful suggestions may be obtained. All sorts of small machines can be economically driven by these motors, especially buffing machines, small drills, hack saws and blowers.



St. Louis Company's Factory, Now Occupied by Bartholomew

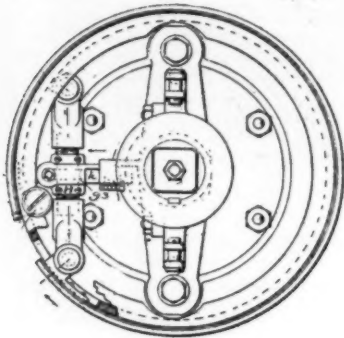
The Bartholomew Company, maker of the Glide cars, has just purchased the factory of the St. Louis Motor Car Company at Peoria, Ill., which it will operate together with its present plant. This acquisition will double the company's capacity and will enable it to take care of an increased output in 1910.

## SOME SELECTED AUTOMOBILE PATENTS

Issue of June 29

**926,141. Clutch**—Charles Schmidt, Cleveland, O. Filed Jan. 15, 1906.

This would appear to be the clutch used on the Peerless cars with slight structural modifications, in the means of supporting the clutch members on the shaft. The clutch is

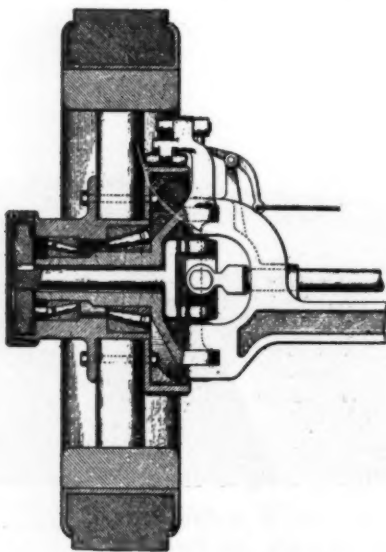


Peerless Clutch Modification.

of the internal expanding type, the band being expanded by means of right- and left-screw working in corresponding nuts in the ends of the band and actuated by a lever under the action of a collar and spring. The collar is provided with suitable forks for connecting with a stirrup upon the shaft carrying the operating pedal whereby the said collar may be withdrawn or released and the clutch contracted or expanded at will.

**926,313. Traction Wheel**—Chester T. Bangs, Chicago, Ill. Filed Dec. 10, 1906.

A combination steering and driving wheel for heavy vehicles with braking means which will operate in any position that the wheel may assume with regard to the axis of the vehicle is the subject of the above patent. The drive is communicated from a lateral shaft to a central spindle within the wheel hub by means of a universal joint. The wheel is clutch-driven as in ordinary practice. A supporting shell is fitted with a pair of radial arms which pivot in a yoke attached to the axle. The brake apparatus is suspended from an extension of the supporting shell and actuated by a bent lever on the yoke. The wheel revolves on bearings on the shell, the brake drum being bolted to the spokes and serving as part of the nave box.



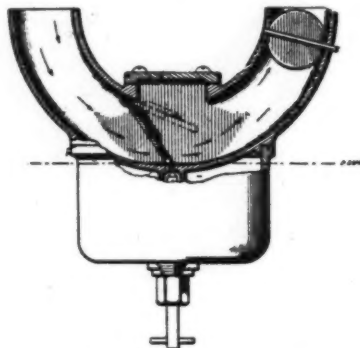
Bangs' Heavy Traction Wheel.

**926,330. Electric Ignition Device**—Theodore Hubert, New York, N. Y. Filed April 4, 1906.

This refers to the Splittorf magneto which is of the low tension type, the current being transformed in a separate coil. The means of altering the time of sparking by rocking a collar on the armature axis consists of a pin upon the internal surface of the collar acting in a spiral groove in the axis so that the axial motion of a handle attached to the collar gives the desired advance or retardation of the time. Connections whereby a dual system of ignition can be used without interference with each other and employing the same distributor for both systems are also features of the specification.

**926,533. Carbureter**—Alexander Winton and Harold B. Anderson, Cleveland, O. Filed March 9, 1907.

This refers to a carbureter combining a float chamber and means for regulating the level of the fuel therein, the chamber being integral with a casting comprising a curved air inlet and mixture passage in which is fitted a check-valve. This valve rises with the suction of the motor and in so doing uncovers the opening from the float chamber to



Winton Carbureter Arrangement

the mixture passage, closing the same when suction ceases. The lower portion of the said passage is fashioned to contain a body of fluid therein so that volatilization is rendered easy and sure.

**926,540. Engine**—Hendrik E. B. Blomgren, Palmyra, N. J. Filed Jan. 27, 1906.

This is an inverted internal combustion motor of the four-cylinder two crank type. Each pair of pistons is attached to a weighted plate provided with bearings which permit it to slide up and down on circular shafts fitted in a frame constructed for the purpose. A connecting-rod serves to connect this plate with the corresponding crank and works within a channel between the two cylinders of the pair. The valves are arranged in the head of the cylinders. The construction of the engine is designed to enable any part to be replaced in case of accident and to allow accessibility of all parts.

**926,157. Turbine Engine**—Carl W. Weiss, New York, N. Y. Filed Sept. 19, 1903.

Weiss here shows an internal combustion turbine, consisting of a rotating drum provided with peripheral curved blades revolving in a casing, and two nozzles in communication with the interior of this casing, the one delivering a continuous stream of products of combustion and the other to deliver simultaneously a stream of steam. No cooling means is provided for the products of combustion before impinging on the curved blades, but the inventor relies on the lower temperature of the steam to reduce the temperature within the casing. The first nozzle is fed from a receiver and exhaust ports are

arranged at various points on the circumference of the casing.

**926,134. Compound Internal Combustion Engine**—Sidney A. Reeve, Worcester, Mass. Filed June 30, 1905.

Reeve here utilizes the exhaust from the high-pressure cylinder to operate a low-pressure cylinder with automatic governors and devices for regulating the inlets of both cylinders according to the load thereon. This engine was recently fully described in these columns.

Issue of July 6, 1909

**926,769. Spring-Wheel**—James E. Reilley, Newark, N. J. Filed Nov. 2, 1907.

In this, Reilley interposes between the felloe and the tire a series of blocks, over which springs are wound. These connect every fourth pair of external blocks, and every pair of internal. Since the wire springs are the only parts which prevent the rotation of the rim relative to the felloe, an unusual strain is placed upon them. That is, the springs must act as springs and carry the driving strain, as well.

**926,771. Ball-Bearing**—Ernst Sachs, Schweinfurt, Germany. Filed Apr. 17, 1907.

A form of ball retainer used on the well-known Fichtel and Sachs ball bearings, or more correctly a means of assembling and disassembling the same. The internal race is made with a deep central groove, into which an oblique groove leads. Through the medium of the diagonal groove the race is really screwed into place.

**926,797. Transmission-Gearing for Automobiles**—Martin L. Williams, South Bend, Ind. Filed Feb. 12, 1906.

This is a plan to combine the engine, transmission, clutch and other parts of the power plant into a single unit. In doing this, the engine is set across the frame, and back of it in a parallel line is the transmission shafts two in number. Since there are three separate drives from the engine to the transmission shaft and two or three differentials, it seems fair to say that this is a complicated device.

**926,848. Carbureter**—John A. Carlson, Denver, Colo. Filed Mar. 27, 1908.

For simplicity, Carlson's carbureter takes the cake, since it comprises but an angle-shaped pipe, with an air inlet at the bottom, governed by a spring, which is interconnected with the fuel inlet in the side of the pipe. As the speed of the engine draws in more air, the opening of the air valve also opens the fuel passage, so more fuel enters.

**926,892. Explosion-Engine**—John Peterson and Frederick O. Peterson, Detroit, Mich. Filed Feb. 24, 1908.

A two-cycle engine with fuel injection. This is arranged so that the carbureter is mounted high up on the side of the engine, where it has communication with the crankcase. The latter has the usual air inlet, and after compressing the air, it is blown through the carbureter, which is little more than a float chamber with a fuel-regulating device. In action, then, the suction stroke does not really draw in anything, for the feed is by pressure, the mixed air and gasoline vapor being forced in. This should result in a very complete charge, although it would doubtless be rather wasteful of the fuel.

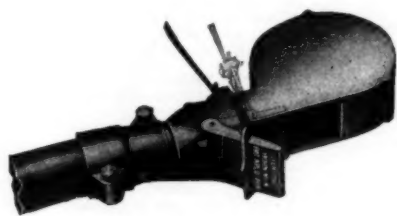
**926,919. Gearing**—Alfred N. Adams, Omaha, Neb. Filed Dec. 23, 1908.

This is a four-wheel drive and steer arrangement, in which the usual transmission is replaced by no less than four small transmissions, one on each stub axle. From the drawing it would appear as if the plan was to locate the engine in the center of the frame.



# Information for Auto Users

**"Jericho" the Horn**—In response to the demand for an inexpensive exhaust horn, the Randall-Faichney Company of Boston has brought out a horn designed to be attached to the exhaust pipe at the rear of the muffler, thus doing away with the complication and expense of the usual cut-out. The device fits on the extreme rear end of the exhaust pipe, so that no cutting of the



JERICHO HORN SHOWN OPEN

pipe is required; the connection is made by means of a clamp coupling which is furnished in sizes to fit any pipe. The construction of the horn itself is novel. It contains no reeds to choke or become clogged, and as the opening is on the under side, obstructions will fall out of themselves, instead of being trapped and retained. The construction and method of attachment will be obvious at once from the cut. Its tone is quite unique. At low speed, for town use, it is said to resemble the call of a loon; but for country driving it becomes far-reaching and insistent. The horn is made in four sizes, some one of which will be found suitable for any size of motor. For cars which are so constructed that there is not room for the horn at the rear of



SPECIAL DESIGN OF JERICHO HORN

the muffler a special design is made in which the connection requires the use of a cut-out; otherwise the horn is on the same principle. The stem of this horn is threaded with one-inch standard pipe thread, and fits the standard cut-out devices. The non-clogging feature and the unique tone make this an ideal horn.

**Crawford's "Special" Oil**—The William J. Crawford Company, 14 Wood street, Pittsburg, Pa., has put on the market a brand of oil under this name specially adapted for automobile use. It is a light-colored, filtered, pure mineral

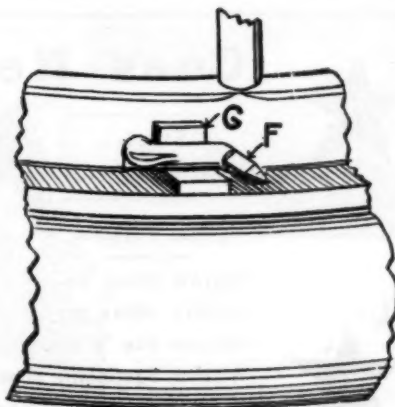
oil, with high viscosity, flash and fire tests, and is claimed to give good lubrication with a minimum of carbon deposit. Another brand is made for steam cars. The oil is put up in barrels, half-barrels and cases, with freight prepaid in the East and in the Mississippi Valley. The prices are especially reasonable.

**Doolittle Demountable Rim**—This addition to the ranks of the demountable rims is built on a new principle, which seems to have several features of merit. The rim is made in a single piece, but is sawed right across. To place it on the wheel the sawed edges are forced apart, expanding the rim so that it slips over the felloe and then is drawn together,



COMPLETE DOOLITTLE DEMOUNTABLE

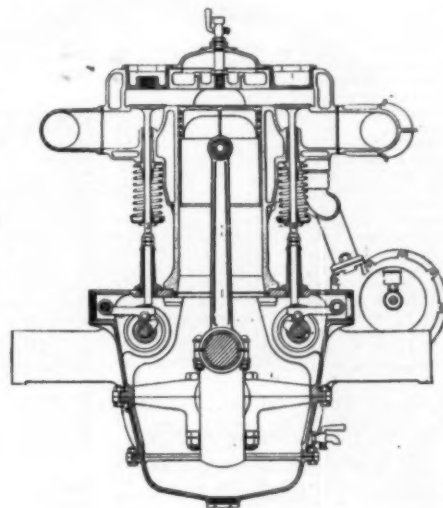
contracting it and setting it tightly into place. The expansion and contraction are effected by means of two turnbuckles, placed side by side and operated at the same time by a double-socketed ratchet wrench. To make it additionally secure two other locks are provided, as shown in the cut, in which F is the locking arm and G the side stop. This construction also facilitates removing the tire from the rim. It is impossible for the rim to



DETAIL OF DOOLITTLE RIM LOCK

stick to the wheel from rust or other causes, as the turnbuckles expand it with a force which immediately loosens it. The turnbuckles are enclosed in telescoping sleeves, so that they are not exposed to mud and dust, and the wheel as a whole presents a very neat appearance. The rims are sold in sets of five, the extra one carrying a fully inflated tire ready for the road.

**New T-Head Motor**—Since the modern tendency is toward specialization, many automobile firms are now buying their engines from an engine specialist. A newcomer in this line is the North American



SECTION NORTH AMERICAN MOTOR

can Motor Corporation, 79 Broad street, Stapleton, Borough of Richmond, New York City, with a motor called the North American. This is of the T-head type, which has gained much favor of recent years, due to the fact that it allows of very large valves, which, in turn, permit of very high and very low speeds. This makes a very flexible engine. As in this item, so also in others, the engines, two in number, are right up to date. The two engines now built are both of four cylinders, the sizes being 4 by 4 1-2 for low powers and 5 by 5 1-2 for higher powers. Other sizes can be made to special order, and, in fact, these two motors can be had in six-cylinder form if desired. An especial feature to which attention is called is the arrangement of the crankcase. This is divided into three compartments, the upper carrying the supporting arms, and to which the cylinders are attached as well as the crankshaft bearings. The next section below that is really but an intermediate section, although it carries the lower halves of the shaft bearings. Below that in turn is the bottom section, which really is but an oil pan. Drain cocks are provided to drain off the oil and, in addition, several large plugs which allow of emptying the pan very rapidly. When emptied of oil, the removal of about a dozen small bolts permits of removing this, in which case it serves as a hand hole or inspection port. This construction allows the running of the engine with the oil pan removed, so that trouble can be instantly detected.

Between the cams and push-rods are interposed small levers which take the thrust and are removable from the exterior.

